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# INFERTILITY

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## Report on Varicocele and Infertility

An **AUA**

Best Practice Policy  
and



**ASRM**

Practice Committee Report

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## How This Document Was Created

This document was written by the Male Infertility Best Practice Policy Committee of the American Urological Association, Inc.<sup>®</sup> (AUA) and the Practice Committee of the American Society for Reproductive Medicine (ASRM). The two organizations agreed to collaborate to prepare documents of importance in the field of male infertility. The Male Infertility Best Practice Policy Committee was created in 1999 by the Board of Directors of the American Urological Association, Inc.<sup>®</sup> The Committee co-chairmen and members were selected by the Practice Parameters, Guidelines and Standards Committee (PPGSC) of the AUA. The membership of the Committee included nine urologists, one reproductive endocrinologist, one family physician and one research andrologist. The mission of the Committee was to develop recommendations, based on expert opinion, for optimal clinical practices in the diagnosis and treatment of male infertility. It was not the intention of the committee to produce a comprehensive treatise on male infertility. This document was submitted for peer review by 125 physicians and researchers from the disciplines of urology, gynecology, reproductive endocrinology, primary care and family medicine, andrology and reproductive laboratory medicine. Modifications were made by the Practice Committee of the ASRM. After the final revisions were made based upon the peer review process and the Practice Committee of the ASRM, the documents were submitted to, and approved by the Board of Directors of the AUA and the Board of Directors of the ASRM. These "Best Practice Policies" are intended to assist urologists, gynecologists, reproductive endocrinologists, primary care practitioners and reproductive researchers. Funding of the Committee was provided by the AUA. Committee members received no remuneration for their work. Each member of the Committee provided a conflict of interest disclosure to the AUA.

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# Introduction

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Varicoceles are present in 15 percent of the normal male population and in approximately 40 percent of men presenting with infertility (1). The preponderance of experimental data from clinical and animal models demonstrates a deleterious effect of varicoceles on spermatogenesis. Testicular temperature elevation and venous reflux appear to play an important role in varicocele-induced testicular dysfunction, although the exact pathophysiology of varicocele-induced damage is not yet completely understood. This review offers recommendations regarding best practice policies for evaluation and treatment of varicoceles.

## Detection of varicoceles

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Evaluation of a patient with a varicocele should include a careful medical and reproductive history, a physical examination and at least two semen analyses. The physical examination should be performed with the patient in both the recumbent and upright positions. A palpable varicocele feels like a “bag of worms” and disappears or is very significantly reduced when the patient is recumbent. When a suspected varicocele is not clearly palpable, the scrotum should be examined while the patient performs a Valsalva maneuver in a standing position.

Only palpable varicoceles have been documented to be associated with infertility. Therefore, ancillary diagnostic measures, such as scrotal ultrasonography, thermography, Doppler examination, radionuclide scanning and sper-

matic venography, should not be used for the detection of subclinical varicoceles in patients without a palpable abnormality. Scrotal ultrasonography, however, may be indicated for clarification of an inconclusive physical examination of the scrotum. Spermatic venography may be useful to demonstrate the anatomic position of refluxing spermatic veins that recur or persist after varicocele repair.

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**Recommendation:** *Routine evaluation of infertile men with varicoceles should include a medical and reproductive history, physical examination and a minimum of two semen analyses. Imaging studies are not indicated for the standard evaluation unless physical exam is inconclusive.*

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## Indications for treatment of a varicocele

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When the male partner of a couple attempting to conceive has a varicocele, treatment of the varicocele should be considered when all of the following conditions are met: 1) the varicocele is palpable on physical examination of the scrotum; 2) the couple has known infertility; 3) the female partner has normal fertility or a potentially treatable cause of infertility; and 4) the male partner has abnormal semen parameters or abnormal results from sperm function tests. Varicocele treatment for infertility is not indicated in patients with either normal semen quality or a subclinical varicocele.

An adult male who is not currently attempting to achieve conception, but has a palpable varicocele, abnormal semen analyses and a desire for future fertility, is also a candidate for varicocele repair. Young adult males with varicoceles, who have normal semen parameters, may be at risk for progressive testicular dysfunction and should be offered monitoring with semen analyses every one to two years, in order to detect the earliest sign of reduced spermatogenesis.

Adolescent males who have unilateral or bilateral varicoceles and objective evidence of reduced testicular size ipsilateral to the varicocele should also be considered candidates for varicocele repair (2, 3, 4, 5). If objective evidence of reduced testis size is not present, adolescents with varicoceles should be followed with annual objec-

tive measurements of testis size and/or semen analyses in order to detect the earliest sign of varicocele-related testicular injury. Varicocele repair should be offered at the first detection of testicular or semen abnormality.

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**Recommendations:** *Varicocele treatment should be offered to the male partner of a couple attempting to conceive, when all of the following are present: 1) a varicocele is palpable; 2) the couple has documented infertility; 3) the female has normal fertility or potentially correctable infertility; and 4) the male partner has one or more abnormal semen parameters or sperm function test results.*

*Adult men who have a palpable varicocele and abnormal semen analyses but are not currently attempting to conceive should also be offered varicocele repair.*

*Young men who have a varicocele and normal semen analyses should be followed with semen analyses every one to two years.*

*Adolescents who have a varicocele and objective evidence of reduced ipsilateral testicular size should be offered varicocele repair. Adolescents who have a varicocele but normal ipsilateral testicular size should be offered follow-up monitoring with annual objective measurements of testicular size and/or semen analyses.*

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## Varicocele treatment, IUI, and assisted reproduction

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Varicocele repair, intrauterine insemination (IUI) and in vitro fertilization/intracytoplasmic sperm injection (IVF/ICSI) are options for the management of couples with male factor infertility associated with a varicocele. The decision as to which method of management to use is influenced by many factors. Most importantly, varicocele repair has the potential to reverse a pathological condition and effect a permanent cure for infertility, as opposed to IUI or ART, which is required for each attempt at pregnancy. Other factors to be considered are the age of the female partner (See ASRM Committee Opinion on Age-Related Infertility), the unknown long-term health effects of IVF and ICSI on the offspring resulting from these techniques, and the possibly greater cost effectiveness of varicocele treatment than of IVF with or without ICSI (6). Finally, failure to treat a varicocele may result in a progressive decline in semen parameters, further compromising a man's chances for future fertility (7, 8, 9).

Varicocele repair usually is not indicated as the primary treatment for couples when IVF is necessary for treat-

ment of a female factor. Nevertheless, there are certain circumstances in which treatment of a varicocele should be considered before initiating ART even when there is a female factor present. Specifically, varicocele repair has been shown to restore at least low numbers of sperm to the ejaculate in some men with non-obstructive azoospermia due to either hypospermatogenesis or late maturation arrest (10, 11). In these cases, varicocele repair may restore sperm to the ejaculate, thus making it possible to perform IVF/ICSI without testicular sperm aspiration or extraction. Therefore, testicular biopsy and varicocele repair may be offered to these men.

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**Recommendations:** *Varicocele repair may be considered as the primary treatment option when a man with a varicocele has suboptimal semen quality and a normal female partner. IVF with or without ICSI may be considered the primary treatment option when there is an independent need for such techniques to treat a female factor, regardless of the presence of varicocele and suboptimal semen quality.*

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## Treatment of varicoceles

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There are two approaches to varicocele repair: surgery and percutaneous embolization. Surgical repair of a varicocele may be accomplished by various open surgical methods, including retroperitoneal, inguinal and subinguinal approaches, or by laparoscopy. Percutaneous embolization treatment of a varicocele is accomplished by percutaneous embolization of the refluxing internal spermatic vein(s). None of these methods has been proven to be superior to the others in its ability to improve fertility.

### **Surgical repair**

Most experts perform inguinal or subinguinal surgical repair employing loupes or an operating microscope for optical magnification. Techniques using optical magnification maximize preservation of arterial and lymphatic vessels while reducing the risk of persistence or recurrence of varicocele (12). Laparoscopy has been used for varicocele repair but this approach carries the risk of major intraperitoneal complications, such as

injury to bowel, bladder and major blood vessels. Although uncommon, intraperitoneal complications may be serious and require laparotomy for correction.

### **Percutaneous embolization treatment**

Percutaneous embolization to repair varicoceles may be associated with less pain than occurs after the standard inguinal surgical approach, but availability of physicians with experience in interventional radiologic techniques is required. Moreover, in some patients, interventional access to the internal spermatic veins cannot be achieved because of technical problems.

### **Complications**

The potential complications of varicocele repair occur infrequently and are usually mild. All approaches to varicocele surgery are associated with a small risk of wound infection, hydrocele, persistence or recurrence of varicocele and, rarely, testicular atrophy. Potential complications from an inguinal incision for varicocele

repair include scrotal numbness and prolonged pain.

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**Recommendation:** *The treating physician's experience and expertise, together with the options available, should determine the choice of varicocele treatment.*

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## Results of varicocele treatment

Surgical treatment successfully eliminates over 90 percent of varicoceles. The results of percutaneous embolization are variable and depend on the experience and skill of the interventional radiologist performing the procedure. Most studies have reported that semen quality improves in a majority of patients following varicocele repair (13).

The fertility outcomes of varicocele repair have been described in numerous published studies. Most of these studies lack adequate numbers of patients, randomization and/or controls, and, therefore, it is not possible to reach a clear conclusion on the fertility outcome of varicocele repair. Of the published controlled studies, the majority have failed to use randomization, men with palpable varicoceles, men with abnormal semen analyses and/or men with normal female partners. Most of these trials, however, show improvement in fertility after varicocele treatment, with only a few indicating that varicocele treatment has little or no effect on fertility. A review of twelve controlled studies found a pregnancy rate of 33 percent (95% confidence interval, 28-39 percent) in couples in which the male received varicocele treatment, as compared with 16 percent (95% confidence interval, 13-20 percent) in untreated couples over one year (6).

There are only two well-designed, randomized, controlled studies using men with palpable varicoceles, abnormal semen parameters and normal spouses (14, 15). While one of the studies showed no greater likelihood of pregnancy following varicocele repair, it did demonstrate significant improvement in testis volume and semen parameters compared to controls (15). The other study, using a crossover design, showed a statistically significant improvement in fertility following varicocele repair (14). The conception rate in couples in which the male had undergone varicocele repair was 60 percent within one year following surgery as compared to only 10 percent in the untreated control group.

Despite the absence of definitive studies on the fertility outcome of varicocele repair, varicocele treatment should be considered as a choice for appropriate infertile couples because: 1) varicocele repair has been proven to improve semen parameters in most men; 2) varicocele treatment may possibly improve fertility; and 3) the risks of varicocele treatment are small.

## Follow-up

Patients should be evaluated after varicocele treatment for persistence or recurrence of the varicocele. If the varicocele persists or recurs, internal spermatic venography may be performed to identify the site of persistent venous reflux. Either surgical ligation or percutaneous embolization of the refluxing veins may be used. Semen analyses should be performed after varicocele treatment at about three-month intervals for at least one year or until pregnancy is achieved. IUI and ART should be considered for couples in which infertility persists after anatomically successful varicocele repair.

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**Recommendations:** *Persistence or recurrence of a varicocele may be treated by either surgical ligation or percutaneous embolization of the refluxing veins.*

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*After treatment of a varicocele, semen analysis should be done at approximately three-month intervals for at least one year or until pregnancy occurs.*

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This report is intended to provide medical practitioners with a consensus of principles and strategies for the care of couples with male infertility problems. The report is based on current professional literature, clinical experience and expert opinion. It does not establish a fixed set of rules or define the legal standard of care and it does not pre-empt physician judgment in individual cases. Physician judgment must take into account variations in resources and in patient needs and preferences.

Conformance with this best practice policy cannot ensure a successful result.

Date of publication:  
April, 2001

ISBN 0-9709327-1-5 (Volume 4) ISBN 09649702-6-0 (4 Volume set)

This report is part of a series on male infertility. Other titles include: *Report on Optimal Evaluation of the Infertile Male*, *Report on Evaluation of the Azoospermic Male* and *Report on Management of Obstructive Azoospermia*.

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