Techniques of Vasectomy

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KEYWORDS

• Vasectomy • Male contraception
• Vasal occlusion • Technique • Vas deferens

Vasectomy is the most commonly performed urologic surgical procedure performed in the United States. An estimated 500,000 men undergo the procedure each year in the United States,[1] equivalent to 11% of all married couples relying on vasectomy for contraception.[2] The widespread use of vasectomy is mirrored by wide variations in surgical techniques, follow-up protocols, and procedural costs. This article discusses key aspects of surgical anatomy, preoperative considerations, commonly used surgical techniques, and postoperative care.

PATIENT COUNSELING

As with any surgical procedure, vasectomy should be performed only after thorough patient counseling is performed. It is ideal if both partners participate in the counseling session. As suggested by Schwingl and Guess, alternative methods of contraception, the intended irreversible nature of vasectomy, and risk for failure should be discussed with each patient.[2] Other risks, including the incidence of chronic pain, should be discussed. A surgeon may be confronted with unique ethical issues, such as unilateral decision making (ie, only the male partner making the decision without his partner involved), young age of the patient, and so forth. These possible scenarios underscore the need for a detailed conversation with each individual patient. Fully informed consent should be obtained only after discussing the risks for the procedure and alternative forms of therapy.

Despite the intended irreversibility of the procedure, up to 6% of men who undergo vasectomy request vasectomy reversal.[3] The most common reasons cited by patients seeking vasectomy reversal include divorce and remarriage.[4,5] Several investigators have shown that men younger than age 30 at the time of vasectomy are 12 times more likely to seek vasectomy reversal in the future than those who underwent vasectomy after age 30.[3,6] Should a patient inquire about the possibility of reversal to regain fertility in the future, a surgeon should carefully discuss the risks and variable success rates of the procedure and its possible cost. Prevasectomy sperm cryopreservation remains an option, although its cost-effectiveness is debatable and may suggest a patient's indecision about permanent contraception. This should be discussed with patients if they request.

SURGICAL ANATOMY

A proper understanding of surgical anatomy lies at the foundation of any successful surgical procedure. The different layers of the scrotum and the course of the vas as it ascends from the scrotum are key points for physicians performing a vasectomy.

Scrotal Tissue Layers

The scrotum contains the testes, epididymis, and portions of the vas deferens. It is divided into halves by the scrotal septum, which is denoted by the median raphe on the scrotal skin. The skin of the scrotum itself is hirsute and contains many sebaceous glands. The scrotal skin is firmly attached to the underlying superficial fascial layer, known as dartos fascia. Deep to the dartos fascia is the external spermatic fascia, which is

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a continuation of the external muscle fascia of the abdominal wall. The external spermatic fascia is continuous over the penis as Buck's fascia. The internal oblique muscle of the abdominal wall gives rise to the cremasteric muscle and fascia. Deep to the cremaster lays the internal spermatic fascia, which is derived from the transversalis fascia. The vas deferens is reached once the internal spermatic fascia is opened. The relationship of scrotal tissue layers in relation to the vas is demonstrated in **Fig. 1**.

Anatomic variations of scrotal anatomy also must be considered when performing vasectomy. In the majority of patients, vasectomy is performed outside of the tunica vaginalis. Autopsy studies show, however, that approximately 12% of men have high insertions of the tunica vaginalis (bell-clapper deformity).[7] In these patients, the tunica vaginalis completely encircles the testis, epididymis, and distal spermatic cord (including the vas). Vasectomy performed in patients who have this variant is, therefore, inside the tunica vaginalis and potentially leads to the development of a hydrocele in some cases.

Vasal Anatomy

Spanning a length of approximately 45 cm, the vas deferens (ductus deferens) connects the testicle to the seminal vesicles, which coalesces with the vasal ampulla to become the ejaculatory ducts. The vas begins at the epididymal tail (globus minor) as the convoluted vas. It is a thick-walled tube consisting of mucosal and submucosal layers surrounded by an outer longitudinal and inner circular smooth muscle.[8] As the vas begins its ascent within the scrotum, it travels medially to the epididymis and then posteriorly as it enters the spermatic cord. It is in this region of the scrotum where the vas can be palpated as a firm cord close to the pampiniform plexus. Once above the testicle, the vas becomes straight as it ascends within the spermatic cord posterior to the cord vessels. Occasionally it can be palpated anteriorly. After the vas passes through the inguinal canal, it emerges in the pelvis lateral to the inferior epigastric vessels.[8] It then passes medially to the other pelvic side wall structures and enters the prostatic base posteriorly. At the terminal end of the vas is the ampulla—a tortuous and dilated segment that is able to store spermatozoa.

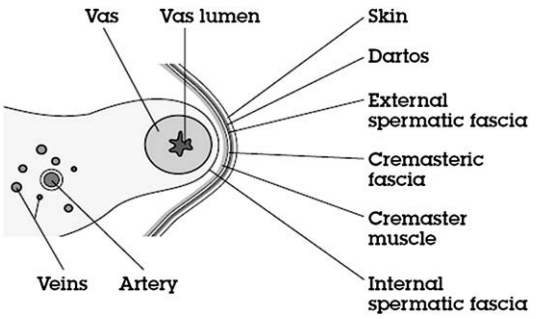

Fig. 1. Scrotal layers in relation to vas. (*Courtesy of* EngenderHealth, New York, NY; with permission. Copyright © 2008. This material is taken from EngenderHealth's "No-scalpel vasectomy: an illustrated guide for surgeons" 3rd ed.)

Blood Supply

The vas receives it blood from the deferential artery—a branch of the inferior vesical artery. Anastomoses between the testicular artery and deferential artery provide collateral circulation to the structures. The cremasteric artery (branch of the inferior epigastric artery) also often participates in the collateral circulation.

OPERATIVE CONSIDERATIONS

Antimicrobial Prophylaxis

The scrotum generally is classified as clean-contaminated because of its close proximity to the perineum.[9] Despite the proximity to the perineum, the incidence of surgical site infection (SSI) after conventional incisional vasectomy or the no-scapel vasectomy (NSV) is low, ranging from 1.5% to 9%.[10–12] For this reason, prophylactic antimicrobials typically are not used when performing vasectomy, especially when performed in the clinic setting.[13] Additionally, the use of prophylactic antibiotics for the prevention of bacterial endocarditis no longer is recommended during urologic procedures.[14] A recent advisory council, however, has recommended the use of prophylactic antibiotic use in select patients who have total joint replacements. These patients include those who have had joint replacements within the past 2 years, are immunocompromised or -suppressed, or who have additional comorbidities, such as HIV, diabetes, malignancy, or prior joint replacement infections.[15]

There are no randomized controlled studies on the use of prophylactic antibiotics with vasectomies but many reports on infectious complications from vasectomy. Many high-volume practices do not use antibiotics but if surgeons prefer the use of prophylactic antibiotics, they should be aimed at preventing infection from common pathogens of the genitourinary tract (*Escherichia coli*, *Proteus* sp, *Klepsiella* sp, and enterococcus) and skin (*Staphylococcus aureus*, coagulase-negative *Staphylococcus* sp, and group A streptococci sp*)*.[13] Common choices for SSI prophylaxis during