

Vas deferens – vasectomy and reversal

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Despite the search for a simple alternative, vasectomy remains the easiest and most effective method of permanent contraception.

Before vasectomy was used as a method of male sterilisation, it was erroneously thought that the procedure might reduce the size of an enlarged prostate or increase the level of circulating male hormones. Its first valid therapeutic use was to prevent retrograde infection following open prostatectomy.

Before this time the procedure had a dubious life as part of a eugenics program for habitual criminals and, more sinisterly, was used by the Third Reich in the 1930s in those deemed undesirable by the regime. Curiously, it was not until 1972 that vasectomy became legal as an operation for contraceptive purposes in the UK. Today, more than 30,000 Australian men undergo vasectomy each year – that is, nearly one in four of the total male population will have a vasectomy in their lifetime.

The vas deferens is nearly 40 cm long and runs from the tail of the epididymis to as far as the prostatic urethra. The muscle wall of the vas deferens is the thickest in the body relative to the diameter of the lumen, which enables the sperm to be forcibly ejected on ejaculation. A section of the vas deferens at the level of the scrotum prevents the sperm mixing with the ejaculatory fluid from the seminal vesicle and prostate (Figure 1).

Permanent contraception is currently the prime indication for having a vasectomy and occasionally it is suggested to prevent retrograde infection reaching the testis. When a patient requests a vasectomy a full history must be taken and a physical examination must be performed. As well as the testes, the scrotum must be examined to exclude any abnormality of the local anatomy possibly due to previous surgery.

Care should be taken when asking questions regarding the reason for proceeding with a vasectomy. Specific questions must include :

- What is the patient's marital status?
- Does the patient have the consent of his spouse?
- How many children does the patient have?
- What is the patient's medical history and what, if any, medication is he taking?

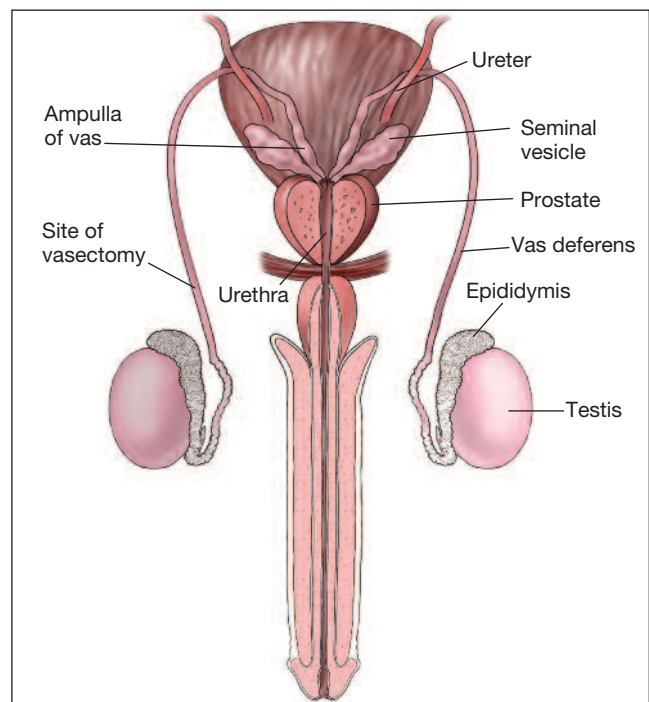


Figure 1. The male reproductive system.

If a candidate is particularly young and asks about sperm storage and the possibility of later reversal, the doctor should be alerted to check carefully again the indications for the operation. An informative pamphlet has been prepared by the Royal Australasian College of Surgeons, which provides detailed information for anyone contemplating this form of contraception.¹

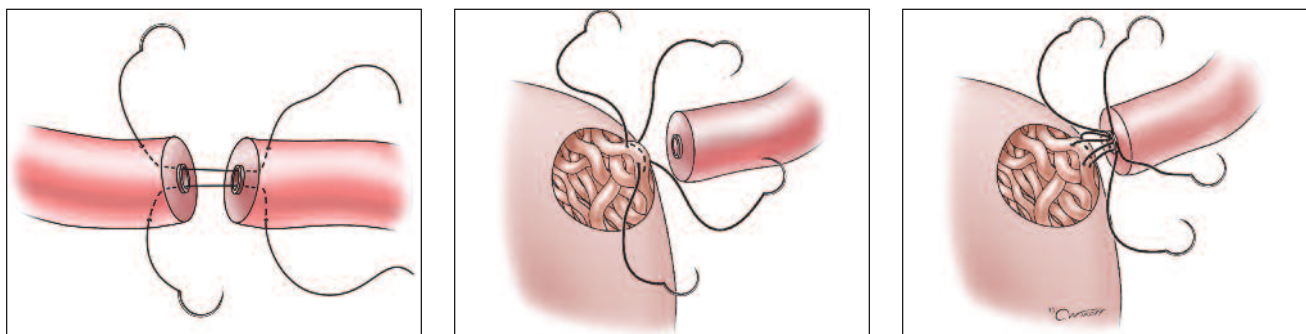
What happens after a vasectomy?

After a vasectomy, there is back pressure on the testes that causes some dilatation of the seminiferous tubules and this in turn causes a reduction in spermatogenesis. There is no change in the secretion of male hormones or potency. There is also no known evidence of a link between vasectomy and the development of cancer of the testis or prostate. After a vasectomy, a man's libido is said to improve because of the removal of the fear of an unwanted pregnancy.

The obstructed sperm are recycled by the body; however, because they are gametes with only half the chromosomal content, they can trigger an antibody response in up to 80% of patients. This causes no medical problem but may affect fertility if a vasectomy reversal is performed.

A small percentage of patients can develop the postvasectomy syndrome. Chronic nonspecific pain can be experienced in one or both testes and it is particularly difficult to treat effectively. Although rarely necessary, a reversal is sometimes needed to cure the pain.

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Figures 2a to c. Suture techniques. a (left). Microsurgical anastomosis in two layers using 9.0 nylon. b (middle). Vasoepididymal anastomosis using double-armed 10.0 nylon. c (right). Intersusception of epididymal tubule into the lumen of the vas deferens following incision with a microscopic scalpel.

Vasectomy procedure

Vasectomy is most often performed in a day surgery facility under either local or general anaesthesia. A ‘no scalpel’ procedure (Li technique)² has been described but the skin is still pierced so most surgeons prefer to make a conventional tiny incision in the scrotum before delivering the vas deferens.

The perivasa sheath and vasal vessels are cleared from the vas deferens, a small segment is excised and the lumen is occluded by two sutures. One end is then buried under a fascial covering. I do not advocate any cautery because this can make reversal more problematic. Histological confirmation is not thought to be necessary but the excised tissue must be carefully examined to be certain that you have operated on two vasa deferentia.

Confirmation of sterility

No sperm in the ejaculate is the desired result. Sperm often do not disappear for many weeks or even months and this depends on the frequency of ejaculation. Recanalisation is rarely needed but must be considered if motile sperm remain in the ejaculate, even in small numbers. The patient is not deemed sterile until there are either no sperm or only an occasional immotile sperm seen on subsequent semen analyses.³

Failure rates of vasectomy are small and directly dependent on the experience of the surgeon.

Reanastomosis of the vas deferens - vasovasostomy

Vasectomy reversal is sought by approximately 5% of men who have had a vasectomy. This is most often because of the formation of a new partnership, sometimes because of the loss of a child or rarely because of persistent postvasectomy pain.

The vas deferens has a tiny lumen, so magnification is needed for this surgical procedure. The best results are achieved when the surgeon is skilled in the use of an operating microscope.

Surgery is performed in a day surgery facility under general anaesthesia and generally takes 1.5 to 2 hours. During the operation, sperm must be identified in the proximal vas deferens by a trained pathologist or scientist present in the operating theatre.

Sometimes sperm cannot be found, indicating proximal obstruction. This is usually due to the rupture of the fragile epididymal tubules from longstanding back pressure following obstruction. Vasoepididymostomy is then necessary and this is a much more difficult procedure because of the microscopic size of the epididymal tubules. However, new suture techniques have greatly improved patency after this anastomosis (Figure 2).

Outcome and expectations

A recent article reported the expected result of studying the kinetics of sperm return to the ejaculate after vasectomy reversal (Figure 3).⁴ The most rapid return was in those patients in whom motile sperm were found at reanastomosis. However, this study

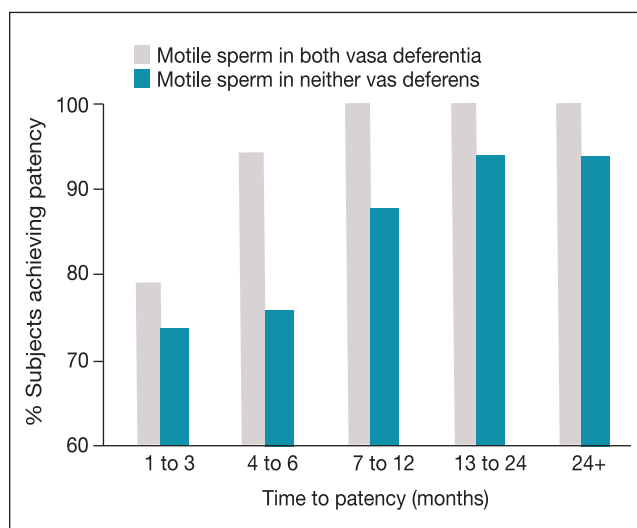


Figure 3. The relation of intraoperative motile sperm in vas deferens on time to patency after vasectomy reversal.⁴ Reprinted from the *Journal of Urology*, 177, Yang G, Walsh T, Shefi S, Turek P. The kinetics of the return of motile sperm to the ejaculate after vasectomy reversal. 2272-2276. © 2007, with permission from the American Urological Association. Published by Elsevier Inc.

clearly showed that the length of time since vasectomy and even age did not impact markedly on the success rate of surgery.

A recent review of the literature comprising more than 3000 procedures showed an overall patency rate of 90%.⁵ Live delivery rates, however, are lower, at about 45 to 50% because of possible problems with antisperm antibodies and the fertility of the partner.

Alternatives to vasovasostomy

An alternative to vasovasostomy is sperm retrieval either by aspiration of the obstructed epididymis (percutaneous epididymal sperm aspiration [PESA]) or by needle or open biopsy of the testis (testicular sperm extraction [TESE]). Sperm retrieval requires the partner to enter an IVF program using intracytoplasmic sperm injection (ICSI) with accompanying ovarian stimulation, egg collection and embryo transfer. The program is quite onerous and should not be undertaken lightly.

Cost also becomes an issue. Vasectomy reversal can now be reimbursed by private health funds and if the procedure is successful conception can occur naturally.

A recent Australian study put the cost of a live birth following a procedure using artificial reproductive techniques at about \$30,000.⁶ Reversal of vasectomy costs about one-third of this amount and is unquestionably lower for a second child. Vasectomy reversal was reinstated as a Medicare benefit in July 2008.

The final choice of procedure will depend on the individual preference of those seeking restoration of fertility. However, both surgery and percutaneous sperm retrieval will come close to achieving the expectations of achieving a pregnancy. **MT**

References

1. The Royal Australasian College of Surgeons. Vasectomy – a guide for men (Treatment information pamphlet). Melbourne: Mi-tec Medical Publishing; 2000.
2. Li S, Goldstein M, Zhu J, Huber D. The no-scalpel vasectomy. *J Urol* 1991; 145: 341-344.
3. The Royal Australasian College of Surgeons. Post-vasectomy testing to confirm sterility: a systematic review. ASERNIP – S report no. 39, 2003. Available online at: http://www.surgeons.org/AM/Template.cfm?Section=ASERNIP_S_Publications&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=22085 (accessed August 2009).
4. Yang G, Walsh T, Shefi S, Turek P. The kinetics of the return of motile sperm to the ejaculate after vasectomy reversal. *J Urol* 2007; 177: 2272-2276.
5. Chambers G, Ho M, Sullivan E. Assisted reproductive technology treatment costs of a live birth; an age – stratified cost – outcome study of treatment in Australia. *Med J Aust* 2006; 184: 115-118.
6. Lee R, Li PS, Schlegel PN, Goldstein M. Reassessing reconstruction in the management of obstructive azoospermia; reconstruction or sperm acquisition? *Urol Clin N Am* 2008; 35: 289-301.

COMPETING INTERESTS: None.