Open-Ended Vasectomy: Approaching The Ideal Technique

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Background: **This study was conducted to determine whether the open-ended technique of vasectomy is an improvement over traditional closed-ended techniques.**

Methods: **A switch from closed-ended to open-ended vasectomy was effected in 1988 at the authors' vasectomy clinic. Patients were contacted by telephone 1 to 3 years after vasectomy.**

Results: **The authors successfully contacted 200 of 257 consecutive open-ended vasectomy patients (78 percent). Among the 200 men there were no reported pregnancies among their partners, but there was one (0.5 percent) failure of the sperm to clear, which was treated by repeat vasectomy. There were 3 (1.5 percent) mild infections, 1 (0.5 percent) sperm granuloma, and 1 (0.5 percent) case of late, intermittent pain.**

Conclusions: **This open-ended vasectomy series has low complication and failure rates, corroborating findings from two larger series. There is no increase in the failure rate using the open-ended technique compared with the closed-ended technique. The single case of late pain is consistent with a decrease in this complication. Open-ended vasectomy approaches the ideal vasectomy. (J Am Board Fam Pract 1994; 7:285-87.)**

In an open-ended vasectomy each vas is cut once, and the prostatic end is cauterized. The prostatic end is then covered with surrounding fascia, using a purse string suture. The testicular end is left open.

Traditionally both ends of the vas are closed. Closing the testicular end has caused a number of problems. Increased intraluminal pressure occasionally leads to the pain of congestive epididymitis or to pain from a sperm granuloma. A sperm granuloma forms when sperm break through the dilated epididymis or vas. When the testicular end is left open, there is no damage to the vas, epididymis, or testicle from increased pressure. Thus, leaving the testicular end open can reduce late postoperative pain. If pain can be reduced without increasing the failure rate, a small but important advance is achieved by using open-ended vasectomy.

The open-ended technique was first studied in Australia, and its advantages were published by Errey and Edwards in 1986.[1]

Methods

We began performing closed-ended vasectomies by electrocautery in 1970 at a Seattle family planning clinic. Based on the evidence from Errey and Edwards, we modified our basic technique in 1988, leaving the testicular end of the vas uncauterized and therefore open.

Men requesting vasectomy were given only one appointment for both counseling and the vasectomy. When they arrived, they were given a fact sheet and a consent form. The procedure was described in detail by an assistant, as were all side effects and possible complications.

All vasectomies in this study were performed by the senior author at Aurora Medical Services using a single midline incision, with the patient under local anesthesia. The open-ended technique, as described in the introduction, was used. Patients were contacted by telephone 1 to 3 years after vasectomies.

Results

A 78 percent follow-up was achieved on the 257 men who had open-ended vasectomies. Among the 200 men contacted there were no known pregnancies among their partners. There was one failure of the sperm to clear. This man had a repeat vasectomy. Three men had a mild postoperative infection, which cleared with doxycycline. One man reported a hematoma of the spermatic cord. Another man reported a mildly symptomatic sperm granuloma. Two men had only one vas (Table 1).

There has been one case of pain persisting after the first few weeks postvasectomy. Since his

Submitted, revised, 18 February 1994.

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Table 1. Open-ended Vasectomy Results: Denniston and Kuehl (n = 200).

Complications	Number	Percent
Failure*	1	0.5
Infection	3	1.5
Hematoma	1	0.5
Sperm granuloma	1	0.5
Absent vas	2	1.0
Pain after 2 weeks	1	0.5

*Not pregnancy.

vasectomy 2 years ago, this man has had a week-long "soreness" approximately every 3 months. He has never considered reversal (Table 1).

Discussion

The ideal vasectomy is comfortable and highly effective in preventing pregnancy, and it does not cause complications or side effects. Since 1900, efforts to improve vasectomy have included using local anesthesia (none was used originally), employing different types of suture material for tying the cut ends, removing a large piece of vas, doubling back the cut ends, and overlapping the cut ends. In 1966 Schmidt[2] introduced the technique of cauterizing both ends and carefully closing the fascial sheath over the prostatic end. Cauterizing the vas permitted scar tissue to form, creating a natural closure. Covering one end provided an additional barrier. Denniston confirmed that cautery plus fascial interposition was superior to tying the vas in a series of 2500 cases.[3] There were 90 percent fewer failures using the fascial barrier in addition to cautery than with ligation alone (0.2 percent versus 2.0 percent).

Similar conclusions were also reached by Esho and Cass.[4] Among the 564 men in whom the ligation method was used, the failure rate was 1.2 percent. Among the 963 men in whom the fulguration (cautery) with fascial sheath interposition method was used, the failure rate dropped to 0.0 percent.

Silber[5] demonstrated that the longer the interval between vasectomy and reversal, the less chance there was for a normal sperm count. He noted: "These findings demonstrate clearly the deleterious effect of *a prolonged duration of obstruction* on successful return of fertility after reconstruction of the vas deferens" (emphasis added).

Silber also discovered that the patients who had sperm granulomas at the time of their reversal also had high sperm counts, no matter how long the interval. Because a granuloma releases the obstruction produced by closing the vas, it would appear that leaving the end open could result in more successful reversals.

Errey acted on this information and began his large series of open-ended vasectomies, reported by Errey and Edwards[1] in 1986. They reasoned that, in addition to better results with reversal, there should be less long-term pain and discomfort. Between 1976 and 1979, Errey saw 3867 men and performed the standard closed vasectomy, closing both ends of the cut vas. Between 1979 and 1983, he performed 4330 open-ended vasectomies. Throughout, he maintained his long-standing policy of return visits for any reason without charge. He saw 106 men with discomfort from epididymal congestion in the year following their vasectomies by the closed-ended technique, whereas he saw only 64 men after he began using the open-ended technique (Table 2).

The two concerns were that if the testicular end was left open, there could be more sperm granulomas at the cut end, and there could be more failures. Errey and Edwards[1] found that neither occurred. In fact, there were fewer sperm granulomas and fewer failures (Table 3 and Table 4).

There should be fewer symptomatic sperm granulomas because granulomas usually form when sperm burst through the walls of the closed vas or epididymis. The results indicate there were 56 fewer symptomatic sperm granulomas.

Moss[6] found similar results in his series.

Another potential concern is the increased risk of autoimmune disease with sperm leakage. Massey, et al.[7] compared 10,000 men with controls 10 years after vasectomy. They looked at

Table 2. Visits in the First Year Postvasectomy for Epididymal Congestion: Errey and Edwards.*

Technique	Number	Percent
Closed	106	2.7
Open-ended	64	1.5

*From Errey BB, Edwards IS. Open-ended vasectomy: an assessment. Fertil Steril 1986; 45:843-6. Reproduced with permission of the publisher, The American Fertility Society.

Table 3. Visits during First Year Postvasectomy for Symptomatic Sperm Granuloma: Errey and Edwards.*

Technique	Number	Percent
Closed	122	3.2
Open-ended	66	1.5

*From Errey BB, Edwards IS. Open-ended vasectomy: an assessment. Fertil Steril 1986; 45:843-6. Reproduced with permission of the publisher, The American Fertility Society.

54 diseases, several of which were autoimmune diseases. None of these diseases was associated with a higher risk among those men who had received a vasectomy.

The results of our study corroborate the work of Errey and Edwards. In our telephone follow-up of 200 men, we observed a low failure rate, a low rate of sperm granulomas, and a low rate of late pain.

The Ideal Vasectomy

The open-ended technique — leaving the testicular end of the cut vas open — provides high effectiveness and minimizes side effects. Combined with the no-scalpel technique or with similar methods of isolating the vas beneath the skin before incising, the theoretical ideal of a perfect vasectomy is being approached. Sperm coming out of the open end rarely produce symptomatic sperm granulomas. Without increased intraluminal pressure, dilatation of the vas lumen is eliminated, making surgical reanastomosis more straightforward. Without increased pressure, the vasectomy has no effect on the testicle.

The prostatic end is cauterized and carefully covered, resulting in an extremely low failure rate. Semen checks, if performed on every patient, could reduce the pregnancies following vasectomy to zero.

Given the low complication and failure rates, researchers seeking any further improvements in vasectomy technique might have to look to radically different technology.

Table 4. Spontaneous Recanalization (Failures): Errey and Edwards.*

Technique	Number	Percent
Closed	3	0.08†
Open-ended	1	0.02†

*Adapted from Errey BB, Edwards IS. Open-ended vasectomy: an assessment. Fertil Steril 1986; 45:843-6. Reproduced with permission of the publisher, The American Fertility Society.
†Difference not statistically significant.

References

1. Errey BB, Edwards IS. Open-ended vasectomy: an assessment. Fertil Steril 1986; 45:843-6.
2. Schmidt SS. Techniques and complications of elective vasectomy. The role of spermatic granuloma in spontaneous recanalization. Fertil Steril 1966; 17:467-82.
3. Denniston GC. Vasectomy by electrocautery: outcomes in a series of 2,500 patients. J Fam Pract 1985; 21:35-40.
4. Esho JO, Cass AS. Recanalization rate following methods of vasectomy using interposition of fascial sheath of vas deferens. J Urol 1978; 120:178-9.
5. Silber SJ. Microscopic vasectomy reversal. Fertil Steril 1977; 28:1191-202.
6. Moss WM. A comparison of open-ended versus closed-end vasectomies: a report on 6220 cases. Contraception 1992; 46:521-5.
7. Massey FJ Jr, Bernstein GS, O'Fallon WM, Schuman LM, Coulson AH, Crozier R, et al. Vasectomy and health. Results from a large cohort study. JAMA 1984; 252:1023-9.