Journal of Andrology, Vol. 24, No. 1, January/February 2003

Outcomes for Vasovasostomy With Bilateral Intravasal Azoospermia

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ABSTRACT: We conducted an evaluation of outcomes for microsurgical vasectomy reversal in which sperm are absent from the vas fluid in order to determine a threshold obstructive interval when vasoepididymostomy (VE) may be indicated. Vasectomy reversal was performed for 32 patients with intravasal azoospermia: 25 received bilateral vasovasostomy (VV), 1 had a bilateral VV, 5 underwent VV/VE, and 1 had bilateral VE. Overall, the patency rate was 50% (14 of 28). Five pregnancies (20%) and 3 live births (12%) occurred in 25 patients with sufficient follow-up. One pregnancy was electively terminated and the other is ongoing, for an ongoing or delivered rate of 16%. The patency rate for VV (either bilateral or unilateral) was 55% (12 of 22). Median obstructive interval was 7 years in patent and 15 years in nonpatent cases, respectively, ($P = .0027$). Sperm were not observed after VV in any case n which the obstructive interval was greater than 11 years. If VV was limited to obstructive intervals of 11 years or less, then the patency rate was 80% (12 of 15) and the pregnancy rate was 38% (5 of 13). The patency rate for bilateral VV was 67% (8 of 12) if clear fluid was observed on at least one side. We conclude that VE is not required in every case of intravasal azoospermia, but it could improve success rates in this setting. Based on our experience, VE may be indicated for intravasal azoospermia if the obstructive interval is more than 11 years.

Key words: Male infertility, vasectomy reversal, vasoepididymostomy.

J Androl 2003;24:22–24

Approximately 6% of men who undergo vasectomy request reversal (Goldstein, 1998). Success with vasovasostomy (VV) is related to the obstructive interval, the quality of the vasal fluid, and female factors (Belker et al, 1991). Secondary epididymal obstruction may occur as a result of a vasectomy. When epididymal obstruction is present, vasoepididymostomy (VE) is required (Silber, 1979). Although results were not as good with VV with bilateral intravasal azoospermia, patency and pregnancy did occur in the report by the Vasovasostomy Study Group (VVSG; Belker et al, 1991). The question in the setting of intravasal azoospermia, therefore, is when to perform VE. The purpose of our study was to evaluate outcomes for microsurgical vasovasostomy (VV) when sperm are absent from the vas fluid and determine a threshold obstructive interval when VE may be indicated.

Materials and Methods

Institutional Review Board approval was obtained for our study. A retrospective review of all microsurgical vasectomy reversals from 1990 thru 2001 at our institution was performed. All cases in which sperm were absent from the vas fluid (either bilaterally or if a unilateral procedure was performed) were identified by review of operative reports. Documentation of gross vasal fluid appearance was also derived from operative reports. Vasal fluid was obtained after the vas was transected proximal to the vasectomy site. The testicular end of the vas was gently ''milked'' to promote the flow of fluid if necessary. The vasal fluid was examined intraoperatively using 400× magnification. If the fluid appeared thick, then it was diluted with a drop of saline to facilitate microscopic examination. In some but not all cases, repeat examination of the fluid was performed. The fluid was not stained for microscopic examination. Microsurgical VV was performed under general anesthesia with a modified one-layer technique with 9-0 nylon (Thomas and Howards, 1997). Microsurgical VE was performed with either a two-layer end-to-side specific tubule anastomosis or, more recently, an end-to-side intussusception technique using 10-0 and 9-0 nylon (Thomas, 1987, Berger, 1998, Marmar, 2000). The primary indication for VE was the presence of thick, pasty fluid devoid of sperm.

Patency and pregnancy data were calculated from a review of medical records. Patency was defined as the presence of motile sperm in at least one semen sample. Patients with less than 6 months follow-up were excluded from the patency rate analysis for VV unless they had sperm in the semen. Patients with less than 6 months of follow-up or no ongoing interest in establishing a conception were excluded from the pregnancy rate analysis

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Received for publication June 19, 2002; accepted for publication August 29, 2002.

Table 1. *Outcomes for vasectomy reversal with intravasal azoospermia*

Number of patients	32
Mean patient age (years)	41.5
Mean partner age (years)	31.8
Mean obstructive interval (years)	11.2
Procedures*	
Bilateral VV	25
Unilateral VV	1
VV/VE	5
Bilateral VE	1
Patency	
All procedures	50% (14/28)
All VV	55% (12/22)
VV ≤11 years	80% (12/15)
Pregnancy	
All procedures	20% (5/25)
All VV	24% (5/21)
VV ≤11 years%	38% (5/13)

* VV, vasovasostomy; VE, vasoepididymostomy

unless they had established a pregnancy. Statistical analysis was performed with Instat computer software (Graphpad Software, San Diego, Calif).

Results

Thirty-two patients with intravasal azoospermia were identified. The results are summarized in Table 1. The procedures performed were bilateral VV (26), unilateral VV (1), VV/VE (4), and bilateral VE (1). The patient who underwent unilateral VV had a history of left testicular torsion and subsequent atrophy of the testis. Overall, the patency rate was 50% (14 of 28). Five pregnancies (20%) and 3 live births (12%) occurred in 25 patients with sufficient follow-up. One pregnancy was electively terminated and the other is ongoing, for an ongoing or delivered rate of 16%. The patency rate for VV (either bilateral or unilateral) was 55% (12 of 22). Secondary azoospermia occurred in two cases (7%). The mean obstructive interval was 7 years in patent and 15 years in nonpatent cases, respectively, for bilateral VV ($P = .0027$). Sperm were not observed after bilateral VV in any case in which the obstructive interval was greater than 11 years. If VV was limited to obstructive intervals of ≤11 years, then the patency rate was 80% (12 of 15) and the pregnancy rate was 38% (5 of 13). The patency rate for bilateral VV was 67% (8 of 12) if clear fluid was observed on at least one side, and 40% (4 of 10) for all other bilateral VVs ($P = 1.0$). The relationship between gross vasal fluid appearance and patency and pregnancy rates is summarized in Table 2.

Table 2. *Relationship between gross vasal fluid appearance and patency and pregnancy rates for vasovostomy*

Fluid	Number	Patency Rate	Pregnancy Rate
Bilateral clear	6	50% (3/6)	0% (0/4)
Bilateral creamy	8	25% (2/8)	0% (0/8)
Bilateral opalescent	1	N/A†	0% (0/1)
Unilateral opalescent	1	100% (1/1)	0% (0/1)
Clear/opalescent*	3	67% (2/3)	67% (2/3)
Clear/creamy	2	100% (2/2)	100% (2/2)
Clear/not known	1	100% (1/1)	0% (0/1)
Not known	1	100% (1/1)	100% (1/1)

* Cases in which the gross vasal fluid appearance was different between the two sides are indicated by the symbol /.

† N/A, not available.

Discussion

The potential for epididymal obstruction is a significant concern that must be addressed at the time of vasectomy reversal. The chance of epididymal obstruction occurring increases with increasing time since the vasectomy (Belker et al, 1991). It may be difficult to prove that epididymal obstruction exists intraoperatively and, if it is present, VE is required (Silber, 1979). VE is significantly more complex and the patency and pregnancy rates with VE are typically lower than with VV (Fogdestam et al, 1986; Silber, 1989; Belker et al, 1991; Schlegel and Goldstein, 1993; Matsuda et al, 1994; Jarow et al, 1995; Thomas and Howards, 1997; Kim et al, 1998; Takihara, 1998) Therefore, when it is possible, VV is preferred.

The absence of sperm in the vasal fluid decreases the chance for success with VV to varying degrees, depending on the report cited. This study as well as others demonstrate, however, that patency and pregnancy can occur (Sharlip, 1982; Belker et al, 1991). In the report by the VVSG, the patency and pregnancy rates with bilateral intravasal azoospermia were 60% (50 of 83) and 31% (20 of 65), respectively. Further stratification of these patients by obstructive interval was not done but it was suggested that VE may be the preferred procedure if sperm are absent from the vas fluid and the obstructive interval is at least 9 years. Although the numbers of patients in each group were small, the gross appearance of the vas fluid appeared to be an important factor because the patency and pregnancy rates were higher with clear or opalescent fluid (Belker et al, 1991). In our study, the presence of clear fluid on at least one side did not appear to improve the chance for patency but the number of patients in this category was small.

In a study by Sharlip (1982), 20 of 161 patients undergoing bilateral VV had intravasal azoospermia. The average obstructive interval for these 20 patients was 9.1 years. The patency and pregnancy rates for the men with bilateral intravasal azoospermia were 60 (6 of 10) and

50% (5 of 10). Because the obstructive interval for these 10 patients ranged from 4–12 years, Sharlip (1982) suggested that intravasal azoospermia was usually not associated with epididymal obstruction if the obstructive interval was less than 12 years, and here therefore concluded that intravasal azoospermia is not always an indication for VE.

A report by Silber (1989) produced opposite conclusions from our study and the two cited above. In the Silber study, all 44 patients with bilateral intravasal azoospermia remained azoospermic postoperatively after bilateral VV. Possible explanations for the disparity between the studies include error in examination of the vasal fluid and reversible abnormalities of sperm transport or epididymal anatomy and function (Sharlip, 1982).

Sheynkin et al (2000) reported a patency rate of 47% (7 of 15) and a pregnancy rate of 7% (1 of 15) for a series of patients with intravasal azoospermia. Ten of these men had vasal obstruction from vasectomy and the remainder from iatrogenic injury. The mean obstructive interval for patent and nonpatent cases did not differ significantly. The difference in outcomes between this and our study may be explained by few patients in both studies, different causes of vasal obstruction, and different techniques for vasal fluid examination.

It may be possible to combine the obstructive interval and the quality of the vas fluid, both known prognostic factors related to epididymal obstruction, in order to formulate guidelines for performing VE in the setting of intravasal azoospermia. In our study, no patient had return of sperm to the semen if the obstructive interval was more than 11 years. When VV was applied to men with obstructive intervals of 11 years or less in our study, the patency and pregnancy rates were 80% and 38%, respectively, which are comparable to results for VE (Fogdestam et al, 1986; Silber, 1989; Schlegel and Goldstein, 1993; Matsuda et al, 1994; Jarow et al, 1995; Thomas and Howards, 1997; Kim et al, 1998; Takihara, 1998).

Newer techniques for VE may improve patency rates, but long-term data on pregnancy rates are not currently available (Berger, 1998; Marmar, 2000) If an individual surgeon has higher patency and pregnancy rates for VE than for those with VV and intravasal azoospermia, then performing VE in all cases of intravasal azoospermia may be justified. A recent report by Fuchs and Burt (2002) suggested that more aggressive use of VE can improve patency and pregnancy rates with prolonged obstructive intervals. In their study, almost two-thirds of men with obstructive intervals of 15 or more years required a VE on at least one side. The results from this contemporary series may represent a significant improvement in success rates compared with series where only VV was performed.

In conclusion, although patency and pregnancy are possible after VV in the setting of intravasal azoospermia, both patency and pregnancy are significantly reduced. If VV is performed only when the obstructive interval is less than a defined threshold, however, then results comparable to VE can be obtained. VE is therefore not required in every case of intravasal azoospermia, but in skilled hands, it could improve success rates in this setting. Based on our experience, VE may be indicated for intravasal azoospermia if the obstructive interval is more than 11 years.

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