

# Outcomes for Vasovasostomy Performed When Only Sperm Parts Are Present in the Vasal Fluid

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**ABSTRACT:** This article reviews the outcomes for vasovasostomy (VV) when only sperm parts were present in the vasal fluid. Thirty-four patients who underwent bilateral (31) or unilateral (3) VV had either sperm parts bilaterally or sperm parts on 1 side and intravasal azoospermia on the contralateral side. Two of the procedures (1 unilateral, 1 bilateral) were repeat procedures. Patient and partner age were  $42 \pm 1.2$  (range: 34–54 and  $33 \pm 0.9$  (range: 23–42) years, respectively. Follow-up was  $10 \pm 1.8$  months. The obstructive interval was  $10 \pm 0.9$  (range: 4–27) years. The patency rate was 76% (26/34). The obstructive interval ranges for patent cases versus not-patent cases were 3 to 21 and 3 to 27 years, respectively. The obstructive interval did not differ between the patent and not-patent groups (9 years vs 11 years,  $P = 0.3978$ ). The pregnancy rate for those with sufficient follow-up was 35% (7/20). Of the 8 failed cases, 2 had only an occasional sperm head bilaterally and 1 other had an

occasional sperm head on 1 side and contralateral intravasal azoospermia. If these 3 cases were excluded, then the patency rate was 84% (26/31). The patency rate for VV performed when only sperm parts were present in the vas fluid was lower than previously reported patency rates with complete sperm but at least as good as most surgeons' experience with vasoepididymostomy. The pregnancy rate was also less than previously reported pregnancy rates with complete sperm. These data suggest that VV is indicated only when sperm parts are noted in the vasal fluid. There does not appear to be a threshold obstructive interval above which VE would be indicated in this setting. If only an occasional sperm head is noted in the vasal fluid, then the surgeon should consider vasoepididymostomy.

Key words: Vasectomy reversal, vasovasostomy, infertility, vasoepididymostomy, vas deferens.

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Patency and pregnancy rates after vasectomy reversal range from 71% to 97% and 26% to 76%, respectively (Thomas and Howards, 1997). Patency depends on surgical technique and experience, the obstructive interval, vasal fluid quality, and whether or not epididymal obstruction is present (Belker et al, 1991; Thomas and Howards, 1997). In the Vasovasostomy Study Group (VVSG), patency rates for vasovasostomy (VV) were greater than 90% as long as there were at least some full sperm noted in the vasal fluid. When only sperm heads were present, the patency rate decreased to 75% (Belker et al, 1991). Therefore, it has been suggested by some that vasoepididymostomy (VE) be considered when incomplete sperm are seen in the vasal fluid. The purpose of this review was to review outcomes for VV when only sperm parts were present in the vasal fluid.

## Materials and Methods

We obtained institutional review board approval for our study. A retrospective review of 3 institutions' experience was performed. Patients with sperm parts (sperm heads or sperm with partial tails) in the vasal fluid bilaterally or sperm parts on one side with intravasal azoospermia on the contralateral side were included in this analysis. Microsurgical VV was performed under general anesthesia with either a modified 1-layer technique or a formal 2-layer technique. Microscopic examination ( $400\times$ ) of the vasal fluid was performed intraoperatively after placing a drop of fluid on a slide and diluting it with saline. Follow-up data were obtained from review of the medical records, phone contact, or written notes from patients. An attempt was made to contact all patients by either phone or letter. A semen analysis (SA) was obtained between 4 weeks and 3 months postoperatively and generally every 3 months until pregnancy occurred or the patient elected to discontinue follow-up. Patency was defined as the presence of motile sperm in at least 1 postoperative SA. Patients with less than 6 months follow-up were excluded from the patency rate analysis unless they had sperm in the semen. Patients who established a pregnancy but did not have an SA were considered patent cases. Patients with less than 12 months follow-up or no ongoing interest in establishing a conception were excluded from the pregnancy rate analysis unless they had established a pregnancy. Results are expressed as mean  $\pm$

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Outcomes for vasovasostomy (VV) with only sperm parts in the vasal fluid; results are expressed as mean  $\pm$  standard error unless otherwise indicated

Number of patients	34
Patient age (y)	42 $\pm$ 1.2
Partner age (y)	33 $\pm$ 0.9
Obstructive interval (y)	10 $\pm$ 0.9
Procedures	34
Bilateral VV	31
Unilateral VV	3
Patency	76% (26/34)
Pregnancy	35% (7/20)
Follow-up (mo)	10 $\pm$ 2
Median obstructive interval (y)	
Overall	9
Patent cases	9
Not-patent cases	11 ( $P = .3978$ )
Obstructive interval range (y)	
Patent cases	3–21
Not-patent cases	3–27

standard error unless otherwise indicated. Statistical analysis was performed with computer software (InStat, Graphpad Software, San Diego, Calif).

## Results

Thirty-four patients who underwent bilateral ( $n = 31$ ) or unilateral ( $n = 3$ ) VV fit the study criteria. Two of the procedures (1 unilateral, 1 bilateral) were repeat procedures. Patient and partner age were  $42 \pm 1.2$  years (range: 30–54) and  $33 \pm 0.9$  years (range: 23–42) years, respectively. Follow-up was  $10 \pm 1.8$  months. The obstructive interval was  $10 \pm 0.9$  years (range: 4–27). The patency rate was 76% (26/34). The patency rate for patients with sperm parts bilaterally was 77% (17/22). The patency rate for patients with sperm parts on one side and contralateral intravasal azoospermia was 75% (9/12). The obstructive interval for the patent and not-patent cases was not different (9 years vs 11 years,  $P = .3978$ ). The obstructive interval ranges for patent cases vs not-patent cases were 3 to 21 years and 3 to 27 years, respectively. One patient with sufficient follow-up had only nonmotile sperm postoperatively and then became azoospermic. Another patient was azoospermic at 3 months and did not return for further follow-up. The pregnancy rate for those with sufficient follow-up was 35% (7/20). The results are summarized in the Table. Of the 8 failed cases, 2 had only an occasional sperm head bilaterally and 1 other had an occasional sperm head on one side and contralateral intravasal azoospermia. If these 3 cases were excluded, then the patency rate was 84% (26/31).

## Discussion

The prognosis after VV depends on several factors, including the vasal fluid quality. If epididymal obstruction is present, VE is required and VV will fail (Silber, 1979). The decision about whether to perform VE is therefore one of the most important intraoperative decisions to be made, if not the most important one. If complete sperm are present, then the decision is straightforward—VV should be performed. If sperm are absent and the vas fluid is clear and watery, then most would perform VV but others would perform VE, regardless of fluid consistency (Silber, 1989; Belker et al, 1991; Sigman, 2004). The obstructive interval can also be factored into the decision because the chance for epididymal obstruction increases with increasing time since the vasectomy (Belker et al, 1991; Kolettis et al, 2003).

In the VVSG, the patency rate for VV was significantly less when only sperm heads were seen, suggesting that some of these men actually had epididymal obstruction (Belker et al, 1991). VE is significantly more complex, and the patency and pregnancy rates with VE are generally 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). In this study, the patency rate with VV was less than is typically seen with complete sperm but comparable with most surgeons' experience with VE. We would therefore contend, as the VVSG group did, that VV should be performed when incomplete sperm are seen in the vasal fluid (Belker et al, 1991). Another recent report also supported the application of VV when only sperm parts were noted. In that study, the patency rate was 96% (25/26) if only sperm parts were present bilaterally (Sigman, 2004). This patency rate is significantly higher than in the VVSG, but there were fewer patients. Our results are more similar to the findings of the VVSG.

The chance for secondary epididymal obstruction after vasectomy increases as the obstructive interval increases (Belker et al, 1991). Recognizing that the patency rate for VV may be lower when incomplete sperm are present in the vasal fluid and that some of these men may therefore actually have epididymal obstruction, we hoped that we could establish a threshold obstructive interval above which VE would be indicated. The range of obstructive intervals was similar for the patent and not-patent groups, however, so it does not appear that any such threshold exists. Also, we compared the obstructive intervals in the patent and not-patent cases, and they were not different (9 years vs 11 years,  $P = .3978$ ). Although the number of patients

studied is small, our study suggests that VV is indicated when incomplete sperm are seen, regardless of the obstructive interval.

Patients with only incomplete sperm, regardless of an assessment of the quantity of these sperm parts, were included in this study. It is possible that those with only an occasional sperm head actually had epididymal obstruction and that the success rate could be improved with better patient selection for VV. Such a distinction between an occasional sperm part and numerous sperm parts is subjective, but if the 3 patients with only an occasional sperm head noted in the vasal fluid had undergone VE, the patency rate for VV would have been 84%. This suggests that if only an occasional sperm head is noted in the vasal fluid, the surgeon should consider VE. We acknowledge that making such a recommendation is difficult based on the outcomes of small numbers of patients.

It is also possible that errors can occur in the intraoperative examination of the vasal fluid. Perhaps what were thought to be sperm heads were actually other cells or some type of debris. The frequency of errors is difficult to measure but would be expected to be low, as the surgeons who contributed to this report are experienced in vasectomy reversal. The lower patency rate most likely represents the presence of epididymal obstruction rather than technical failure. In the lead author's experience, if full sperm are present in the vasal fluid on at least 1 side, then the patency rate (sperm in the semen) is 98%.

In conclusion, the patency rate for VV when only sperm parts were present in the vas fluid was lower than previously reported patency rates with complete sperm but still comparable with most surgeons' experience with VE. The pregnancy rate was also less than previously reported pregnancy rates with complete sperm. These

data suggest that VV is indicated when sperm parts are noted in the vasal fluid. When only sperm parts are present in the vasal fluid, there does not appear to be a threshold obstructive interval above which VE would be indicated. If only an occasional sperm head is noted in the vasal fluid, then the surgeon should consider VE.

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