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A Different Female Partner Does Not Affect the Success of Second Vasectomy Reversal

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ABSTRACT: The aim of the study was to determine whether the pregnancy rate with the same female partner or younger partners was higher compared with different or older partners after undergoing repeated vasectomy reversal. A total of 44 patients were enrolled in the present study. The cause of reversal in patients with the same partner was the desire to have more children in 14 cases, the loss of a child in 7 cases, and the desire for a son in 7 cases. Patients were asked about pregnancy and childbirth during follow-up visits and by telephone or mail. Following microsurgical vasectomy reversal, patency was observed in 38 men (86.4%). Twenty-five of the couples (56.8%) achieved pregnancy without any artificial conception technique. We did not observe a significant difference in the pregnancy rate (57.1% vs 56.3%, $P = .954$) between patients with the same or a different female partner. In the multivariate model used, partner age was the only independent predictor for pregnancy. Patients with a partner less than 35 years old had a 4.1-fold greater chance (odds ratio, 4.13; 95% confidence interval, 1.06–16.10; $P = .041$) of pregnancy than those with a partner 35 years old or older. The area under the receiver operating characteristics curve for partner age was 73.0% (95% confidence interval 56.8–89.2, $P = .011$). Our findings suggest that repeat microsurgical vasectomy reversal still remains a reasonable choice for patients with different female partners. However, it should be considered that the likelihood of achieving pregnancy after repeat vasectomy reversal may decrease with advancing age of the female partner.

Key words: Infertility, vasovasostomy, microsurgery, sterilization reversal, testes.

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Microsurgical vasectomy reversal has proven to be a highly successful procedure; however, up to 30% of reversals fail, either from a compromised vasal anastomosis or an unrecognized secondary epididymal obstruction (Silber, 1979). There are documented patency and pregnancy rates for vasectomy reversal in patients with the same female partner (Kolettis et al, 2003). Fuchs and Burt (2002) reported that spousal age was an important predictive factor after vasectomy reversal among patients with reversals 15 years or more after their vasectomy. If failures are more common following the initial vasectomy reversal in men with a different female partner or an older partner, these findings raise the question of whether repeat vasectomy reversal should be considered for this specific group. Although repeat vasectomy reversals are common and they accounted for 15% of vasectomy reversals reviewed for our previous series (Paick et al, 2003) and in the Vasovasostomy Study Group (Belker et al, 1991), no reports concerning female factors are available for patients who have undergone a second microsurgical anastomosis after a failed initial procedure.

We characterized the treatment outcome (pregnancy rate) for microsurgical vasectomy reversal in men with a history of one or more failed vasectomy reversals. The purpose of our study was to determine whether the pregnancy rate was higher with the same female partner or younger partners compared with older or different female partners when men have a history of one or more failed vasectomy reversals. In addition, we examined a variety of factors in an attempt to identify the predictive factors of successful surgical outcome in patients who underwent a repeat procedure.

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Materials and Methods

The records of men undergoing vasectomy reversal between 1992 and 2000 were reviewed and 82 patients were identified for whom one or more prior attempts at vasectomy reversal had failed. All the cases were drawn from the operative pool of a single surgeon (J.S.P). Patients for whom postoperative semen analysis had never been done were excluded from study unless pregnancy for their partner had been reported. Those patients whose postoperative semen contained sperm but if pregnancy follow-up data was unavailable during the follow-up period, then they were excluded from the pregnancy rate calculations, and so, a total of 44 patients were finally enrolled in the present study. The causes of reversal in patients with the same partner were the desire to have more children in 14 cases, the loss of a child in 7 cases, and the desire to have a son in 7 cases. When the 2 groups were compared, patients with a different female partner had a significantly higher patient age ($P < .001$) and longer interval since their vasectomy ($P = .023$). Clinical characteris-

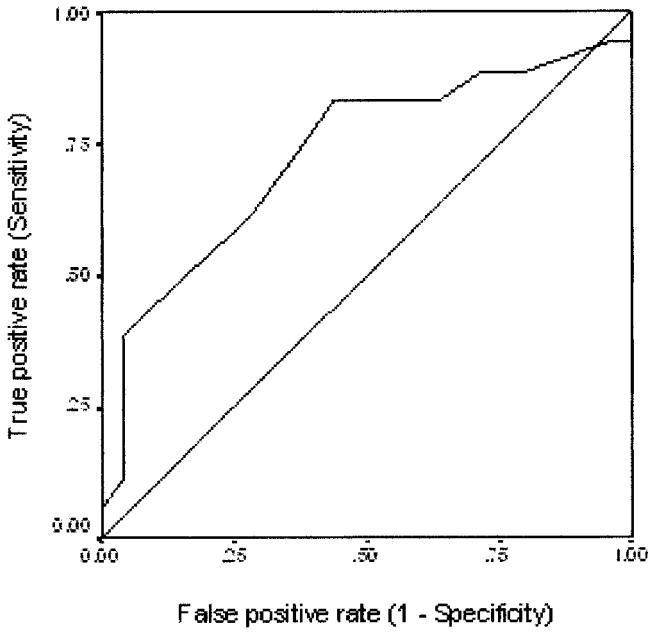
Table 1. *Clinical characteristics, intraoperative findings, and operative results between patients with same and different female partner*

	Total	Same Partner	Different Partner	*P*
Patients (n)	44	28	16	
Median patient age (y)	37 (32–56)	36 (32–46)	40 (34–56)	<.001
Median partner age (y)	35 (28–49)	34.5 (28–42)	35 (30–49)	.878
Median interval (y)				
Since vasectomy	8.5 (3–23.7)	7 (3–14)	10.1 (4.7–23.7)	.023
Since first vasectomy reversal	2.7 (0.7–9)	3 (0.8–9)	2.3 (0.7–6)	.349
Median patient age at vasectomy (y)	29 (23–39.3)	28 (23–39.3)	30.5 (23.4–38.3)	.103
Sperm at operation (%)				
Present*	23 (52.3)	15 (53.6)	8 (50.0)	
Absent	21 (47.7)	13 (46.4)	8 (50.0)	
Reconstruction type (%)				.113
Bilateral vasovasostomy	40 (90.9)	24 (85.7)	16 (100.0)	
Others†	4 (9.1)	4 (14.3)	0 (0.0)	
Anastomotic levels (%)				.851
Straight vas‡	31 (70.5)	20 (71.4)	11 (68.8)	
Convoluted vas	13 (29.5)	8 (28.6)	5 (31.3)	
Patency rate (%)	38 (86.4)	25 (89.3)	13 (81.3)	.652

* At least 1 vas.
† Unilateral vasovasostomy only in 2 patients and unilateral vasovasostomy with contralateral epididymovasostomy in 2.
‡ Vasovasostomy to straight vas at a minimum of 1 side.

tics of patients with the same or different partner are shown in Table 1.

At least 2 semen analyses were performed preoperatively to confirm the patients' azoospermia. Microsurgical repeat vasectomy reversal was performed as described previously (Paick, 2000; Paick et al, 2003). Intravasal fluid was evaluated for sperm using a touch preparation examined by the surgeon and/or a pathologist. All patients underwent bilateral microsurgical vasovasostomy with 2-layer end-to-end anastomosis if surgically possible, and this was done regardless of the presence of sperm in the intraoperative vas fluid. Four patients underwent unilateral vasovasostomy only or unilateral vasovasostomy with contralateral epididymovasovasostomy because the vassal length was severely compromised as a result of a previous vasovasostomy. The mean follow-up period in these patients was 4.1 years (0.7–8.2). Initial postoperative semen analysis was performed 1 month after the operation and repeated at 2- to 3-month intervals. The patency rate was defined as the presence of motile sperm in at least 1 postoperative semen sample. Patients were asked about their partner's pregnancy and childbirth during the follow-up visits and by telephone or mail.



Receiver operating characteristics curve for partner age. Area under the curve was 0.730.

Statistical comparisons of continuous data were performed using the Mann-Whitney *U* test. Categorical variables were compared using the chi-square test or Fisher exact test. To evaluate influencing factors for pregnancy, odds ratios and the *P* values for trends were estimated by logistic regression analysis. The associations between these parameters and increased operation time were described using maximum likelihood estimates of relative risk and 95% confidence intervals based on the regression model. The receiver operating characteristics curve was used to indicate the predictive ability of the clinical variables for pregnancy. The area under the receiver operating characteristics curve was estimated. All calculated *P* values were 2-sided and a *P* value of less than .05 was considered statistically significant. SPSS 10.0 (SPSS, Inc, Chicago, Ill) was used for all statistical analyses.

Results

Following microsurgical vasectomy reversal, patency was observed in 38 men (86.4%). Twenty-five couples (56.8%) achieved pregnancy without any artificial conception tech-

Table 2. *Univariate and multivariate logistic regression analyses for pregnancy**

	OR (95% CI)	*P*	Adjusted OR (95% CI)	*P*
Patient (y)				
<40	2.090 (0.763–11.085)	.118	2.741 (0.617–12.171)	.185
≥ 40	1.000	1.000		
Partner age (y)				
<35	4.62 (1.240–17.226)	.023	4.127 (1.058–16.097)	.041
≥35	1.000	1.000		
Partner type				
Same	1.037 (0.300–3.581)	.954		
Different	1.000			
Interval since vasectomy (y)				
<10	1.145 (0.346–3.794)	.824		
≥10	1.000			
Interval since first vasectomy reversal (y)				
<2.5	0.409 (0.120–1.390)	.152	0.679 (0.169–2.735)	.586
≥2.5	1.000	1.000		
Patient age at vasectomy (y)				
<30	1.350 (0.405–4.503)	.625		
≥30	1.000			
Sperm at operation				
Present	1.026 (0.311–3.386)	.967		
Absent	1.000			
Reconstruction type				
Bilateral vasovasostomy	0.739 (0.094–5.786)	.773		
Others	1.000			
Anastomotic levels				
Straight vas	0.759 (0.202–2.848)	.683		
Convoluted vas	1.000			
Patency				
Present	1.462 (0.351–6.085)	.602		
Absent	1.000			

* OR indicates odds ratio; CI, confidence interval.

nique, but 2 of these pregnancies spontaneously aborted. Pregnancies were achieved 2–48 months (mean 6.5) after the operation. We did not observe a significant difference in the pregnancy rate (57.1% vs 56.3%, $P = .954$) or delivery rate (50.0% vs 56.3%, $P = .690$) in patients with the same or different female partner.

Logistic regression analyses were performed to evaluate the factors that affected pregnancy. Univariate analysis indicated that patient age, partner age, and the time interval from the first vasectomy reversal were possible factors. In the multivariate model used in this study, partner age was the only independent predictor for pregnancy. Patients with a partner less than 35 years old had a 4.1-fold greater chance (odds ratio, 4.13; 95% confidence interval, 1.06–16.10; $P = .041$) of pregnancy than those with a partner 35 years old or older. The results are shown in Table 2.

The Figure shows the predictability of partner age for pregnancy. The closer the area under the receiver operating characteristics curve approaches 1.0 (ie, the closer the receiver operating characteristics curve approached the upper left-hand corner), the greater the predictive

Table 3. *Comparison of postoperative semen parameters in patients who achieved patency*

	Pregnancy Group	No-pregnancy Group	*P*
Patients (n)	25	13	
Median sperm counts ($\times 10^6$/mL)	37.5 (4.5–126.0)	23.5 (4.7–132.0)	.238
Median sperm motility (%)	47.5 (15.0–70.0)	45.0 (10.0–60.0)	.402
Median sperm morphology (%)	28.0 (18.0–50.0)	29.5 (20.0–35.0)	.973

power. The area under the receiver operating characteristics curve for partner age was 73.0% (95% CI 56.8–89.2, $P = .011$).

We divided the 38 patients who achieved patency into 2 groups, those whose partner achieved pregnancy (n = 25) and those whose partner did not (n = 13). When postoperative semen parameters were compared, there were no statistically significant differences of sperm concentration, motility, and morphology in the 2 groups (Table 3).

Discussion

Approximately 38% of men who undergo vasovasostomy will fail to achieve pregnancy with their partner despite adequate postoperative sperm concentrations (Belker et al, 1991). Sharlip (1993) proposed 3 explanations for failure: partner infertility, epididymal dysfunction, and antisperm antibodies. Considering the success rates of assisted reproductive techniques, one should be able to give advice to these patients regarding the option of reoperation. The success rates, costs, and possible complications are important factors in the couples' decision on treatment options. Regarding cost effectiveness, it is generally accepted that repeat microsurgical vasectomy reversal should be considered favorably for failed vasectomy reversal cases even in this era of intracytoplasmic sperm injection (Fox, 1997; Donovan et al, 1998). However, most importantly, vasectomy reversal offers the possibility of natural conception.

Reliable predictors of successful reversal and the data impacting vasovasostomy failure are extremely important. A higher incidence of divorce and remarriage has brought more attention to the study of factors affecting the success rate of vasectomy reversal. Several investigators have concluded that the success of vasectomy reversal is dependent on female factors, such as age. Hernandez and Sabanegh (2003) suggested that previous conception with the current partner was a predictor of further conception. In a recent study (Kolettis et al, 2003), fertility outcomes of patients who underwent vasectomy reversal and attempted conception with the same female partner were higher. Previous studies have examined outcomes after reversal according to female age. The ovarian reserve decreases with advancing age, and so age is one of the most critical factors affecting female fertility potential (Schwartz and Mayaux, 1982). Deck and Berger (2000) performed a cost analysis for couples with female partners older than 37 years. They reported live delivery rates of 17% and 8%, and costs per delivery were $28 530 and $103 940 for vasectomy reversal and for sperm retrieval and intracytoplasmic sperm injection, respectively. A recent study by Fuchs and Burt (2002) demonstrated that the chance for pregnancy after vasectomy reversal decreased with advancing female age. They stratified their results according to the female partner's age for reversal after obstructive intervals of 15 years or more. The pregnancy rates for women 36–40 and older than 40 years were 32% and 28%, respectively. Both of these studies have demonstrated lower delivery rates overall, but these rates still compared favorably with intracytoplasmic sperm injection in this population.

However, there is little information regarding the significance of female factors for repeat procedures. Prognostic factors previously associated with vasovasostomy, such as intraoperative sperm detection, the obstructive interval, reconstruction type, and anastomotic site did not influence the pregnancy rate in our series. Of the 44 couples with available follow-up data, 13 achieved patency after the surgery but they failed to achieve pregnancy. The reason for repeat vasectomy reversal in 4 of 13 men who achieved patency without pregnancy was remarriage, while 10 of the 13 men had female partners 35 years old or older. In multivariate analysis, the increased age of the wife was noted as the only poor prognostic factor for pregnancy. This is an important fact to consider when counseling this specific group on their treatment options for having biologic children.

Conclusions

Our findings suggest that repeat microsurgical vasectomy reversal remains a reasonable choice for male patients with different female partners as well as the same female partner. However, it should be considered that the likelihood of achieving pregnancy after repeat vasectomy reversal may decrease with advancing female age. We believe that this information is useful to couples who are considering a repeat vasectomy reversal.

References

Belker AM, Thomas AJ Jr, Fuchs EF, Konnak JW, Sharlip ID. Results of 1,469 microsurgical vasectomy reversals by the Vasovasostomy Study Group. *J Urol.* 1991;145:505–511.

Deck AJ, Berger RE. Should vasectomy reversal be performed in men with older female partners? *J Urol.* 2000;163:105–106.

Donovan JF Jr, DiBaise M, Sparks AE, Kessler J, Sandlow JI. Comparison of microscopic epididymal sperm aspiration and intracytoplasmic sperm injection/in-vitro fertilization with repeat microscopic reconstruction following vasectomy: is second attempt vas reversal worth the effort? *Hum Reprod.* 1998;13:387–393.

Fox M. Failed vasectomy reversal: is a further attempt worthwhile using microsurgery? *Eur Urol.* 1997;31:436–440.

Fuchs EF, Burt RA. Vasectomy reversal performed 15 years or more after vasectomy: correlation of pregnancy outcome with partner age and with pregnancy results of in vitro fertilization with intracytoplasmic sperm injection. *Fertil Steril.* 2002;77:516–519.

Hernandez J, Sabanegh ES. Repeat vasectomy reversal after initial failure:

overall results and predictors for success. *J Urol.* 1999;161:1153–1156.

Kolettis PN, Woo L, Sandlow JI. Outcomes of vasectomy reversal performed for men with the same female partners. *Urology.* 2003;61:1221–1223.

Paick JS. Vasectomy reversal. *Int J Urol.* 2000;7:S28–S34.

Paick JS, Park JY, Park DW, Park K, Son H, Kim SW. Microsurgical vasovasostomy after failed vasovasostomy. *J Urol.* 2003;169:1052–1055.

Schwartz D, Mayaux MJ. Female fecundity as a function of age: results of artificial insemination in 2193 nulliparous women with azoospermic husbands. Federation CECOS. *N Engl J Med.* 1982;306:404–406.

Sharlip ID. What is the best pregnancy rate that may be expected from vasectomy reversal? *J Urol.* 1993;149:1469–1471.

Silber SJ. Epididymal extravasation following vasectomy as a cause for failure of vasectomy reversal. *Fertil Steril.* 1979;31:309–315.