

## PREGNANCY OUTCOMES AFTER VASECTOMY REVERSAL FOR FEMALE PARTNERS 35 YEARS OLD OR OLDER

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### ABSTRACT

**Purpose:** We review the outcomes after vasectomy reversal for couples with female partners 35 years old or older.

**Materials and Methods:** A retrospective review of experience at 2 institutions was performed. Patency was defined as the presence of motile sperm. Patients with less than 6 months of followup were excluded from the patency rate analysis unless they had sperm in the semen. Similarly, patients with less than 12 months of followup or no ongoing interest in establishing conception were excluded from the pregnancy rate analysis unless they had established a pregnancy or they were azoospermic with sufficient followup.

**Results:** A total of 46 men with partners 35 years old or older underwent vasectomy reversal at 2 institutions. Mean partner age was  $37 \pm 2$  years, and median obstructive interval was 10 years. Bilateral vasovasostomy was performed in 43 men, unilateral vasovasostomy in 2 and vasovasostomy/vasoepididymostomy in 1. Of the 46 men 27 had followup semen analyses with a patency rate of 81% (22). Transient patency occurred in 2 cases (7%). Pregnancy occurred in 35% of the couples (14 of 40 patients) with sufficient followup. The ongoing/live delivery rate was 33% (13 of 40 cases). The pregnancy and ongoing/delivery rates were 46% (12 of 26 patients) and 46% (12 of 26) for female partners 35 to 39 years old, and 14% (2 of 14) and 7% (1 of 14) for female partners older than 40, respectively.

**Conclusions:** Vasectomy reversal offers reasonable chance for success when the female partner is 35 years old or older. The chance for success is similar to that of a single cycle of in vitro fertilization with intracytoplasmic sperm injection. These couples should not be eliminated from consideration for reversal simply because the female partner is 35 years old or older.

**KEY WORDS:** vasovasostomy, oligospermia, vasectomy, pregnancy

Vasectomy related infertility is a correctable cause of male infertility, and approximately 6% of men who undergo vasectomy request reversal.<sup>1</sup> Factors that influence the chance for success include the obstructive interval, surgical technique, surgical experience, quality of the vasal fluid and female factors.<sup>2</sup> Ovarian reserve decreases with advancing age, and so age is one of the most critical factors affecting female fertility potential.<sup>3</sup> The other alternative for couples with vasectomy related infertility to have their own biological children is sperm retrieval and in vitro fertilization (IVF) with intracytoplasmic sperm injection (ICSI). The chance for pregnancy with sperm retrieval and IVF/ICSI also decreases with advancing female age.<sup>4</sup> Thus, both of these treatment options would be expected to have poorer results in this patient population. We review the fertility outcomes for patients who underwent vasectomy reversal and attempted conception with female partners 35 years old or older.

### MATERIALS AND METHODS

A retrospective review was conducted at 2 institutions to identify men who underwent microsurgical vasectomy reversal and who had female partners 35 years old or older. Microsurgical vasovasostomy was performed with the patient under general anesthesia with either a modified 1-layer tech-

nique with 9-zero nylon or a 2-layer technique with 10-zero and 9-zero nylon.<sup>5</sup> Microsurgical vasoepididymostomy was performed with either a 2-layer end-to-side specific tubule anastomosis or more recently an end-to-side intussusception technique.<sup>6–8</sup> Indications for vasoepididymostomy varied between the 2 institutions but the primary indication was thick and pasty vasal fluid devoid of sperm.

Followup data, including patency and pregnancy rates, were obtained from review of the medical record. Patency was defined as the presence of motile sperm in at least 1 postoperative semen sample. Patients who underwent vasovasostomy with less than 6 months of followup or vasoepididymostomy with less than 12 months of followup were excluded from the patency rate analysis unless they had sperm in the semen. Patients with less than 12 months of followup or no ongoing interest in establishing a conception were excluded from the pregnancy rate analysis unless they had established a pregnancy. Thus, patients who underwent vasovasostomy and were azoospermic at 6 months were included in pregnancy rate calculations. Also, patients without a semen analysis, if they had sufficient time and actively attempted a pregnancy, were included in the pregnancy rate calculation.

### RESULTS

A total of 46 men with partners 35 years old or older underwent vasectomy reversal at the 2 institutions. Mean partner age was  $37 \pm 2$  years, and median obstructive interval was 10 years. Bilateral vasovasostomy was performed in

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43 men, unilateral vasovasostomy in 2 and vasovasostomy/vasoepididymostomy in 1. Of the 46 men 27 returned for followup semen analyses with a patency rate of 81% (22). Transient patency occurred in 2 cases (7%). Pregnancy occurred in 35% of the couples (14 of 40 patients) with sufficient followup. There was 1 miscarriage, and so the ongoing/live delivery rate was 33% (13 of 40 patients). The pregnancy rates for couples with female partners 35 to 39 years old and older than 40 were 46% (12 of 26) and 14% (2 of 14), respectively. The ongoing/live delivery rate for the couples with partners 35 to 39 years old was equivalent to the pregnancy rate. The live delivery rate in women older than 40 years was 7% (1 of 14).

#### DISCUSSION

The chance of pregnancy after vasectomy reversal is related to several factors including the obstructive interval, quality of the vasal fluid and female factors.<sup>2</sup> We examined the effect of 1 critical female factor, namely age, on the chance for success after vasectomy reversal. Female fecundity decreases with advancing age and the impact of age becomes more significant at approximately age 35 years.<sup>3</sup> Similarly, because of decreasing ovarian reserve the chance for pregnancy with IVF/ICSI, the other alternative for these couples, decreases significantly after age 35.<sup>4</sup>

Data from the Vasovasostomy Study Group<sup>2</sup> and the 1999 Society for Assisted Reproductive Technologies (SART) report<sup>4</sup> suggest that the chance for pregnancy is higher with vasectomy reversal if the obstructive interval is 15 years or less, although Fuchs and Burt suggested that ICSI did not surpass reversal unless the obstructive interval was more than 20 years.<sup>2,4,9</sup> On the other hand, individual groups have reported significantly higher pregnancy rates than the national average and cumulative pregnancy rates for IVF/ICSI were not reported by SART.<sup>10</sup>

We compared the success rates for the 2 alternatives for female partners 35 years old or older. The ongoing or delivery rate in our series was 33% while the live delivery rate for a single cycle of IVF for females 35 to 37, 38 to 40 and 41 to 42 years old was 26%, 18%, and 10%, respectively, according to SART.<sup>4</sup> These rates suggest that vasectomy reversal is superior to a single cycle of IVF/ICSI when the female partner is 35 to 40 years old. The number of couples with a female partner older than 40 years in our study was small and a comparison was difficult although the delivery rate was low with both options. Also, previous studies have demonstrated that vasectomy reversal is more cost-effective than sperm retrieval and ICSI.<sup>11-13</sup> The main reason for the significant difference in cost is the incidence of multiple births, which in the 1999 SART data accounted for 36.6% of live births with IVF.<sup>4</sup> Accordingly, couples with vasectomy related infertility should not necessarily be directed to sperm retrieval and ICSI simply because of advanced female age.

Previous studies have examined outcomes after reversal related to female age. Deck and Berger performed a cost analysis for couples with female partners older than 37 years.<sup>13</sup> They reported live delivery rates of 17% and 8%, and costs per delivery were \$28,530 and \$103,940 for vasectomy reversal, and sperm retrieval and ICSI, respectively. Fuchs and Burt stratified results according to female partner age for reversal after obstructive intervals of 15 years or more.<sup>9</sup> The pregnancy rates for women 36 to 40 and older than 40 years were 32 and 28%, respectively. The delivery rate in the 40 and older group was 14%. Both of these studies demonstrated lower delivery rates overall but these rates still compared favorably to ICSI in this population.

Some limitations of our study deserve mention. A significant number of our patients did not have a followup semen analysis, and so the patency rate was calculated for a smaller subset of patients. At 1 of the participating institutions the

couples were more prone to frequent relocation, making followup more difficult. Those couples with 1 year or more of followup were still included in pregnancy rate calculations, however, which is the main issue of our paper. Despite this limitation, we were still able to support our conclusion that vasectomy reversal can still be offered to these couples as a reasonable option. A second limitation is that all but 1 patient had undergone bilateral vasovasostomy. Increased use of vasoepididymostomy when indicated would likely have improved patency rates and ultimately pregnancy rates.

In our study we compared vasectomy reversal to a single cycle of ICSI. Cumulative ICSI delivery rates of 45% (6 cycles) and 21% (2 cycles) have been reported for women 35 to 37 and 38 to 39 years old, respectively.<sup>14,15</sup> Thus repeated attempts may improve the overall pregnancy rate. Also, the pregnancy rate for ICSI with obstructive azoospermia may be higher. A review of all cases of vasectomy related obstructive azoospermia was performed by Sharlip.<sup>16</sup> The clinical pregnancy rate was 35.3%. Assuming the same miscarriage rate as reported in the SART data, the live delivery rate would be 28.6%. Whether this 3% to 4% difference is statistically (or clinically) significant is debatable.<sup>16</sup>

Another issue that must be considered is time to achieve pregnancy. In the Vasovasostomy Study Group the mean time to establish a pregnancy was 12.4 months and a majority of the pregnancies were achieved within 2 years. How long a couple should continue to attempt natural conception before pursuing assisted reproductive techniques is not certain. Clearly this is problematic because their chance for pregnancy with ICSI will continue to decrease with time. Finally, the delivery rate with reversal for women 40 years old or older in our series was 7% (1 of 14). Therefore, careful preoperative counseling is critical in this group of patients.

#### CONCLUSIONS

Compared to sperm retrieval and ICSI, the results for vasectomy reversal are at the least comparable and may be superior in couples with older female partners. In our series there was only 1 live delivery for a woman older than 40 years and, therefore, careful preoperative counseling is required for these couples. Vasectomy reversal can allow for natural conception, is more cost-effective and does not have an increased risk of multiple births. Couples with vasectomy related infertility and older female partners should not necessarily be directed to sperm retrieval and ICSI simply because of age.

#### REFERENCES

1. Sandlow, J. I., Westefeld, J. S., Maples, M. R. and Scheel, K. R.: Psychological correlates of vasectomy. *Fertil Steril*, **75**: 544, 2001
2. Belker, A. M., Thomas, A. J., Jr., Fuchs, E. F., Konnak, J. W. and Sharlip, I. D.: Results of 1,469 microsurgical vasectomy reversals by the Vasovasostomy Study Group. *J Urol*, **145**: 505, 1991
3. Schwartz, D. and Mayaux, M. J.: Female fecundity as a function of age: results of artificial insemination in 2193 nulliparous women with azoospermic husbands. *Federation CECOS. N Engl J Med*, **306**: 404, 1982
4. United States Department of Health and Human Services, Centers for Disease Control and Prevention. 1999 Assisted Reproductive Technology Success Rates
5. Thomas, A. J. and Howards, S. S.: Microsurgical treatment of male infertility. In: *Infertility in the Male*, 3rd ed. Edited by L. I. Lipshultz and S. S. Howards. St. Louis: Mosby Co., chapt. 12, pp. 371-384, 1997
6. Thomas, A. J., Jr.: Vasoepididymostomy. *Urol Clin North Am*, **14**: 527, 1987
7. Berger, R. E.: Triangulation end-to-side vasoepididymostomy. *J Urol*, **159**: 1951, 1998
8. Marmar, J. L.: Modified vasoepididymostomy with simultaneous double needle placement, tubulotomy, and tubular invagination. *J Urol*, **163**: 483, 2000

9. Fuchs, E. F. and Burt, R.: 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*, **77**: 516, 2002
10. Palermo, G. D., Schlegel, P. N., Hariprashad, J. J., Ergun, B., Mielnik, A., Zaninovic, N. et al: Fertilization and pregnancy outcome with intracytoplasmic sperm injection for azoospermic men. *Hum Reprod*, **14**: 741, 1999
11. Pavlovich, C. P. and Schlegel, P. N.: Fertility options after vasectomy: a cost-effectiveness analysis. *Fertil Steril*, **67**: 133, 1997
12. Kolettis, P. N. and Thomas, A. J., Jr.: Vasoepididymostomy for vasectomy reversal: a critical assessment in the era of intracytoplasmic sperm injection. *J Urol*, **158**: 467, 1997
13. Deck, A. J. and Berger, R. E.: Should vasectomy reversal be performed in men with older female partners? *J Urol*, **163**: 105, 2000
14. Osmanagaoglu, K., Tournaye, H., Camus, M., Vandervorst, M., Van Steirteghem, A. and Devroey, P.: Cumulative delivery rates after intracytoplasmic sperm injection: five year follow-up of 498 patients. *Hum Reprod*, **14**: 2651, 1999
15. Osmanagaoglu, K., Tournaye, H., Kolibianakis, E., Camus, M., Van Steirteghem, A. and Devroey, P.: Cumulative delivery rates after ICSI in women aged >37 years. *Hum Reprod*, **17**: 940, 2002
16. Sharlip, I.: Vasectomy reversal vs. sperm retrieval/ICSI after vasectomy: which is better? Presented at the American Society for Reproductive Medicine, San Francisco, California, October 5, 1998