

CLINICAL ASSISTED REPRODUCTION

Reproductive Outcome After Sterilization Reversal in Women of Advanced Reproductive Age¹

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Objective: Our objective was to assess the clinical outcome of tubal reversal in women of advanced reproductive age.

Methods: A multicenter retrospective chart review of 153 patients who underwent a tubal ligation reversal was carried out. Patients were evaluated according to age. All patients had documented ovulation and a partner with a normal semen analysis by WHO criteria. Outcome measures included rates of clinical pregnancy, ectopic pregnancy, spontaneous abortion, and live birth, and the time to conception.

Results: Clinical pregnancy rates were significantly lower in women ≥ 40 compared to younger groups. The time to conception was significantly shorter for women < 30 compared to women ≥ 35 . No pregnancies occurred in women ≥ 42 .

Conclusions: Our data support the judicious use of sterilization reversal for infertile women with no male factor through their early forties. Women ≥ 42 years should be especially counseled as to the very low success rates.

KEY WORDS: sterilization reversal; advanced reproductive age; pregnancy.

INTRODUCTION

Bilateral tubal ligation is the most common form of contraception in women over the age of 30 in the United States. However, up to 15% of patients subsequently regret their sterilization because of changes in their life circumstances (1). Ultimately, a number of women seek surgical reversal (2–4). Sterilization reversal has proven efficacious, with estimated birth rates of more than 50% (4,5).

Numerous factors are believed to influence the successful outcome of surgery (4). The influence of age is difficult to evaluate. Increased age is often associated with ovarian disturbances and older male partners often have coincident pathology. In series of women up to age 39, increasing age did not significantly influence the pregnancy success rate (6). Recently, two reports have evaluated the efficacy of sterilization reversal in women ≥ 40 years of age. Trimbos-Kemper (7) reported that 34 of 78 (44%) older women had a child after reanastomosis, while Glock *et al.* (8) reported a live birth rate of only 6 of 42 (14.3%). We sought to evaluate patients over 39 years old contemplating sterilization reversal attending infertility clinics at three major teaching centers and compare their results to those for younger counterparts.

MATERIALS AND METHODS

A retrospective review was performed of patients who underwent a tubal reanastomosis between July 1988 and July 1995 at three large academic medical

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centers. Patients' charts were reviewed for results of surgery and subsequent pregnancies. A diligent effort was made to contact all patients by telephone and mail. Only patients with complete follow-up were included in the analysis. Length of follow-up ranged from 1 to 9 years.

Patients undergoing sterilization reversal were grouped according to age: Group I (<30 years; $n=38$), Group II (30–34 years; $n=62$), Group III (35–39 years; $n=51$); and Group IV (≥ 40 years; $n=24$). All patients had documented ovulation and a partner with a normal semen analysis by WHO criteria. Twenty-two patients were lost to follow-up, with six, seven, six, and three patients lost to Groups I, II, III, and IV, respectively. Basal FSH levels were 10.8 ± 5.0 , 12.8 ± 9.0 , 14.2 ± 3.0 , and 13.9 ± 2.5 in Groups I, II, III, and IV, respectively.

Sterilization reversal was accomplished using standard microsurgical techniques as described previously (5). One hundred twelve patients (73.2%) underwent bilateral tubal reanastomosis, while the other 41 (26.8%) underwent a unilateral procedure. No additional adjunctive therapy was given. The proportion of patients undergoing bilateral procedures did not differ between the groups (Group I, 28/32, 88%; Group II, 45/55, 72.7%; Group III, 27/45, 60%; Group IV, 17/21, 81%; NS). Isthmic–isthmus reanastomosis were performed in 57.5% of cases, 32% were isthmus–ampullary, 9.1% were ampullary–ampullary, and 1.4% were cornual–isthmus. Following anastomosis, the tubal length was similar in all groups (Group I, left 5.4 ± 0.4 cm, right 5.2 ± 0.4 cm; Group II, left 5.4 ± 0.2 cm, right 5.6 ± 0.2 cm; Group III, left 4.9 ± 0.3 cm, right 5.3 ± 0.3 cm; Group IV, left 5.2 ± 0.6 cm, right 5.7 ± 0.8 cm; NS).

Outcome measures included rates of clinical pregnancy, ectopic pregnancy, spontaneous abortion, and live birth and the time to conception. Data analysis was performed with chi-square and ANOVA using the SPSSx statistical package, with significance assessed at $P < 0.05$.

RESULTS

Results are shown in Table I. Overall, clinical pregnancy rates were significantly lower in Group IV compared to younger groups. However, although the live birth rate showed a similar trend, the results did not reach statistical significance. Miscarriage and ectopic pregnancy rates were similar among groups. The time to conception was significantly shorter for Group I compared to Groups III and IV (4.5 ± 0.5 versus 8.3 ± 0.9 and 10.3 ± 2.2). No pregnancies occurred in women older than 42 years.

DISCUSSION

Historically, sterilization reversal has been the mainstay for women seeking to have more children who have previously undergone tubal sterilization. A few reports in the literature also support this approach as an acceptable method of infertility treatment for women of advanced reproductive age (7,8). However, with the ready availability of assisted reproductive technologies, in vitro fertilization (IVF) has established itself as a therapeutic alternative to surgery. On the other hand, the delivery rate per IVF cycle for women ≥ 40 years old without male-factor infertility was

Table I. Pregnancy Outcomes^a

	Group I (<30 years)	Group II (30–34 years)	Group III (35–39 years)	Group IV (≥ 40 years)
Age (years)	27.9 ± 0.3	32.1 ± 0.2	36.5 ± 0.3	41.0 ± 0.5
PR ^b	78% (25/32)	69% (38/55)	55% (25/45)	24% (5/21)*
Live birth rate	47% (15/32)	35% (19/55)	27% (12/45)	19% (4/21)
Miscarriage rate	12% (3/25)	14% (5/38)	24% (6/25)	20% (1/5)
Ectopic rate	16% (7/25)	37% (14/38)	28% (7/25)	0% (0/5)
Time ^c	$4.5 \pm 0.5^{**}$	6.1 ± 0.6	8.3 ± 0.9	10.3 ± 2.2
(range)	(1–8)	(2–14)	(1–21)	(5–24)

^a There were no significant differences in delivery rates among the four groups. No pregnancies were seen in women >42 years of age.

^b Clinical pregnancy rate.

^c Time until conception (months).

* $P < 0.05$ compared to Groups I, II, and III.

** P -value < 0.05 compared to Groups III and IV.

10.6% in 1995 (9), less than the live-born rate of 19% in our series. This deficit may be partially overcome with multiple IVF cycles, albeit at an increasing economic cost.

Alternatively, some have championed IVF over surgical sterilization reversal on the basis of cost (10). A cost comparison in younger women has estimated that the cost per live birth after tubal surgery is \$17,000, compared with \$12,000 after IVF (11). This cost comparison, however, was based on the cost of an IVF cycle in Norway, which was only \$1,500. In the United States, the cost of IVF is much higher. Furthermore, the cost per live birth for both IVF and sterilization reversal is higher in women of advanced reproductive age due to declining fecundability.

In conclusion, our data support the judicious use of sterilization reversal for infertile women with no male factor through their early forties. Women should be carefully screened for ovarian reserve with a day 3 serum follicle stimulating hormone/estradiol and/or a clomiphene challenge test. Also, women older than 42 years should be especially counseled as to the very low success rates. IVF may offer comparable or greater efficacy per treatment cycle but may require multiple cycles to attain success. Many couples, however, may choose sterilization reversal based on the cost, the possibility of insurance copayment, the avoidance of side effects associated with infertility medications, and less of an intrusion in their lives.

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