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SURGICAL OUTCOME OF MICROSCOPIC VASECTOMY REVERSAL: AN ANALYSIS OF 30 CASES

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ABSTRACT

The results of 30 consecutive microscopic vasovasostomy procedures performed at a single institution over a five-year period between 1991 and 1995 were reviewed. When the surgical outcomes of patients who were operated on less than five years after their vasectomy were compared with the outcomes of those patients who received a vasovasostomy more than five years after their vasectomy, decreases in technical success rates were observed as measured by appearance of sperm in ejaculate (56% vs. 36%), biologic recovery as measured by mean sperm counts (56 million vs. 35 million) and mean progressive sperm motility (44% vs. 21%), along with a decrease in clinical success, as measured by overall pregnancy rates (50% vs. 7%, $p < 0.05$). Therefore, a microscopic vasovasostomy within 5 years of a vasectomy is a favorable procedure for vasectomy reversal.

Key Words: Vasectomy reversal, Microsurgery, Interval, Pregnancy

INTRODUCTION

Other than abstinence, the use of condoms and vasectomy remain the only two options available today for male birth control. The latter procedure is intended as a permanent intervention. Vasectomy is the most popular method of birth control in the world today.[1] Because of fear of child death in the developing world, changing views about family life in the western world, and the increasing prevalence of divorce and remarriage, there is now a large number of men requesting vasectomy reversal. For many years the pregnancy rate after surgical reanastomosis of the vas had been very low, and a variety of explanations have been offered for the relatively poor success in reversing vasectomies.[2–6] With the advent of microsurgical techniques, pregnancy rates improved considerably, suggesting that purely micro-mechanical factors were associated with the low success rates.

Many techniques for vasovasostomy have been described, but since the early reports of Owen, Silber and others, microsurgery has achieved widespread acceptance with good results.[7–9] The experience of the operating surgeon seems to be the most significant variable determining successful outcome. In this paper we discuss the surgical outcome of 30 cases of vasectomy reversal performed by the same surgeon in relation to the elapsed time interval since vasectomy.

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MATERIALS AND METHODS

Between January 4, 1991 and January 30, 1996, a total of 30 consecutive microscopic vasovasostomy procedures to reverse prior vasectomies were performed at our institution. The mean age of these 30 patients was 36.3 years at the time of vasovasostomy (range 25 to 42 years). The mean interval since vasectomy was 6.1 years, with a maximum interval of 15 years. We analyzed the relationship of the obstructive interval since vasectomy to pregnancy, and with regard to sperm concentrations in the vas fluid and in the semen. Furthermore, we studied the correlation between sperm count or motility and the elapsed time interval since vasectomy.

The technique used for each microscopic vasovasostomy was as follows. Under general anesthesia, the patient was well cushioned and his feet were placed on a padded stool. The surgeons sat comfortably with their knees under the operating room table, and the objective lens of the scope was approximately 20 cm away from the scrotum. The operating zoom pedal and the bipolar cautery pedal were situated on the floor within easy reach of the operator's feet. It was imperative that both the surgeon and the assistant checked the functions and the ocular system of the microscope (Karl Storz, OPMIMD, Universal-S3, Germany) thoroughly before surgery. The microscope was draped but the light source remained free to prevent overheating. The scrotum was shaved because hair mimicked suture material and interfered with the surgical procedure.

Two anterior vertical incisions were made high on the scrotum. These incisions were high as the abdominal portion of the vas was more difficult to render tension-free, whereas the testicle could be easily moved upward, freeing any tension on the testicular portion of the vas. If the site of the previous vasectomy could be palpated, the ends of the vas were simply exteriorized; if not, the scrotal contents were extruded in an extravaginal fashion. It was wise not to enter the tunica vaginalis during this procedure because, if one returned later for a vasoepididymostomy, the dissection would be more difficult. Even with a large gap between the cut ends of the vas, the incision could always be extended towards the inguinal region, enabling the distance between the ends to be bridged. After the healthy ends of the vas were freed, they were tacked with the perivasal tissue to the scrotal incision during the procedure to ensure a tension-free anastomosis. In spite of a rich anastomotic network of vessels around the outer vas layer, care was taken with the bipolar cautery to avoid excessive cauterization or snipping of the vas. Excessive dissection could affect both the vascularity of the vas and its sympathetic nervous supply. The fibrotic ends of the vas were transected with either a microsurgical knife or a razor blade with a piece of wooden tongue placed beneath the vas for countertraction.

The abdominal side of the vas was then examined and dilated with a lacrimal probe. Patency of the vas was tested either with a 2–0 nylon suture passed up the lumen or by irrigation with 2–3 ml saline. Methylene blue was used to stain the mucosa of the vas. If the vasectomy was done in the convoluted portion of the vas, we needed to free only a small portion to allow placement of the vas clamp. The convoluted vas was unraveled as this might disturb the blood supply. Additional length to provide a tension-free anastomosis was gained by carefully dissecting the sheath of the convoluted vas free of its attachment to the tunic of the epididymis. The convoluted vas had to be transected transversely to yield a round ring of mucosa with a lumen directed straight down.

The intraoperative microscopic examination of the vas fluid for sperm from the testicular end was particularly important. A No. 22 medicut was gently inserted into the lumen, and the fluid allowed to rise by capillary action. The vas and epididymis needed to be gently milked to obtain a small amount of fluid, which was diluted with saline prior to staining for microscopic examination. As sperm have a reactive effect on surrounding tissue, we irrigated the field with a small tuberculin syringe. After the vas fluid had been examined and the decision to carry out a vasovasostomy had been made, the freed ends of the vas were placed in the jaws of a vasovasostomy clamp and a colored plastic section or Weck surgical spear was placed beneath for better visual contrast and to facilitate suture grasping. The clamp was particularly useful when we applied the anterior layer of sutures, because we could then flip the clamp over to visualize the posterior wall of the vas. The anastomosis was performed under 16—25 × magnification. A two-layer anastomosis allowed for good mucosal approximation with no muscle bridging between the cut ends. If the mucosal sutures were adequately spaced, we could match the undilated mucosal lumen of the abdominal side with the dilated lumen of the testicular side. The first stitch of 10—0 nylon placed from the outside included the elastic layer next to the mucosa. The first two sutures were placed 180° apart and held in a neurosurgical Heifitz microclip; the third stitch was placed between these sutures and tied; the clips were then removed and the first two sutures were tied. The outer muscularis layer was then approximated with four sutures of 8—0 nylon. The vasovasostomy clamp was then flipped 180° and the posterior anastomosis was done in a similar manner. Stents were not used as they resulted in sperm leakage, inflammation and scarring. With this technique, we obtained a water-tight, leak-proof, mucosa-to-mucosa anastomosis that was tension-free. The chi-square test was used to test for an association of categorical factors.

RESULTS

Table 1 shows the elapsed time interval since vasectomy, the number of patients with sperm seen in the vas fluid, the number of patients with sperm returned to ejaculate and the pregnancy rate. In 16 patients operated on within five years of their vasectomies, 12 had sperm in the vasal fluid (75%). Of these 12, nine had return of sperm to the ejaculate and eight patients eventually impregnated their wives (50%). In 14 patients operated on more than five years after their vasectomy, seven had sperm in the vasal fluid (50%). Of these seven, five had return of sperm to the ejaculate and only one patient had a successful pregnancy (7%). This difference was statistically significant ($p < 0.05$). All of the 11 patients who had no sperm in the vas fluid were azoospermic and did not impregnate their wives. Of the 14 patients who had sperm patency, the pregnancy rate was 69%.

Table 1: Relationship of the interval since vasectomy to sperm in the vas fluid, sperm in the semen, and the rate of pregnancy following microscopic vasovasostomy.

Interval (Yrs.) Postvasectomy	Patients	Sperm in the Vas Fluid	Sperm in the Semen	Pregnancy
0–5	16	12 (75%)	9 (56%)	8 (50%)
6–10	9	6	4 (44.4%)	1 (11%)
>10	5	1	1 (20%)	0 (0%)
Totals	30	19 (63%)	14 (47%)	9 (30%)

The technical success rate, as measured by return of sperm to the ejaculate, was 47% overall (Table 2). As might be expected, this varied with elapsed time interval since vasectomy. In those patients operated on within five years of their vasectomy, 56% had sperm returned to the ejaculate, whereas of patients operated on more than five years after their vasectomy, only 36% had return of sperm. This difference was not statistically significant.

Sperm motility was also examined in this series in terms of percent progressive motility at one hour. Again, percent motility correlated with years elapsed since vasectomy (Table 3). In those patients operated on within five years of their vasectomy, 44% had progressively motile sperm returned to the ejaculate, whereas of patients operated on more than five years after vasectomy, only 21% had return of progressively motile sperm. This difference was not statistically significant.

Of 30 bilateral vasovasostomy procedures, a total of two complications occurred. The overall surgical complication rate was 6.7%. These complications consisted of a scrotal hematoma and wound separation, which were both considered to be minor. Mean operating timewas 187 ± 3.5 minutes (mean ± S.D.).

Table 2: Sperm count following microscopic vasovasostomy: correlation with the interval since vasectomy.

Interval (Yrs.) Postvasectomy	Mean Sperm Count (Millions/mL)	Patients with Sperm Returned to Ejaculate No./Total	(%)
0–5	56	9/16	56%
6–10	38	4/9	44%
>10	21	1/5	20%
Totals	48.4	14/30	47%

Table 3: Sperm motility following microscopic vasovasostomy: correlation with the interval since vasectomy.

Interval (Yrs.) Postvasectomy	Mean Motility (%)	Patients with Motile Sperm in Ejaculate No./Total	(%)
0–5	32	7/16	44%
6–10	11	2/9	22%
>10	3	1/5	20%
Totals	46	10/30	33%

DISCUSSION

A previous large series report has demonstrated that as the period of elapsed time between vasectomy and vasovasostomy increases, especially if this interval exceeds five years, the surgical success rates of reanastomosis decrease.[10] Our present result is consistent with this report. In our present series, technical success rates as measured by return of sperm to the ejaculate, biologic recovery as measured by sperm counts and sperm motility, and clinical success as measured by pregnancy rates, were observed to decline if more than five years had elapsed following vasectomy.

Theories for the consistently poor results with vasectomy reversal have included development of sperm antibodies, damage to the deferential nerve and testicular damage.[11] Yet some investigators questioned any correlation between sperm antibodies in the serum and subsequent fertility after vasovasostomy,[12] and the effect, if any, of vasectomy on the testis in humans and animals has also been very controversial.[13] Segregating the various studies by species has not cleared up the confusion. If any testicular damage occurs, the generally agreed upon mechanisms would be either autoimmune or pressure related.[13] The pressure increase subsequent to vasectomy has been well established, as well as the effect of this pressure on epididymal dilatation, perforation and sperm inspissation in the epididymis, causing secondary epididymal obstruction.[14] In our series, the fertility rate for the patients who had no epididymal damage as evidenced by sperm being present in the vas fluid was significantly higher than that for the patients who had no sperm in the vas fluid, suggestive of secondary epididymal blockage.

One must consider the increased operating time, expenses and results of microsurgical vasectomy reversals compared to the same parameters of macroscopic vasovasostomy. Kabalin et al. reported that overall pregnancy rate with macroscopic vasovasostomy was 23%.[15] Of those patients operated on within five years of their vasectomy, the pregnancy rate was 31%.[15] Macroscopic vasovasostomy with loupes is a reasonable procedure in the straight portion of the vas deferens, but not in the convoluted areas. The skill and experience of the surgeon is probably more important than the surgical technique. The results noted in their report are satisfactory for a macrosurgical technique. However, the pregnancy rates for comparable patients are not as good as those reported with microsurgical techniques in general, including our results.[10] Additionally, complication rates and the mean operating time of microscopic vasovasostomies were similar to those of macroscopic vasovasostomies in our series.[15] Thus we believe that the results of microsurgical reversals are indeed sufficiently better than those of macroscopic procedures to justify the increased expenses of microsurgery. We prefer the microscopic technique, particularly because the surgeon cannot know preoperatively whether the anastomosis will have to be done in the convoluted segment of the vas deferens.

In conclusion, microscopic vasovasostomy is a favorable procedure for patients who are seeking vasectomy reversal. The pregnancy rate for patients with up to five years of elapsed time since their vasectomy was significantly higher than that for those patients operated on more than five years after their vasectomy. Hence, people who wish to have a child after a vasectomy should undergo a microscopic vasovasostomy within five years of their vasectomy.

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