Monolateral Tubulovasostomy

Report of Four Cases

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After conventional vasoepididymostony, the epididymal lumen may become occluded or obstructed, resulting in recurring azoospermia. Recently, two-layer direct anastomosis has been advocated on the basis of experimental models of tubulovasostomy performed in rats. Monolateral tubulovasostomy was performed in four cases under 16–40 times magnification. Nylon or 11/0 Vycril® was used as suture material for the internal layer of the anastomosis, and 10/0 Ethilon® was used for the external layer. After three and six months, semen samples were evaluated for sperm count and motility. The presence of spermatozoa in all the samples confirmed 100% patency of the duct. Three patients had a number of spermatozoa compatible with fertility, and one pregnancy occurred.

Key words: male infertility, vas deferens, tubulovasostomy, epididymis, epididymal obstruction.

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Microsurgical tubulovasostomy, that is, direct end-to-end anastomosis of the mucosal layer of the vas deferens and the epididymal tubule, was introduced by Silber (1978) because of the poor results with conventional vasoepididymostomy in the treatment of azoospermia secondary to epididymal obstruction. (Audebert, 1980)

In the majority of patients, tubulovasostomy must be carried out on both sides during the same operation; therefore, the patency of each anastomosis cannot be definitively assessed.

We report here on four cases of successful tubulovasostomy carried out on only one side because of the following reasons: monorchism, contralateral atrophic testis, past right epididymectomy, previous epididymites.

Microsurgical Method

The seminal tract was surgically explored through an infrapubic approach (two cases) or a midline scrotal incision.

Vasography was performed with a very thin needle and nonionic contrast medium (Amipaque) in order to assess the patency of the upper seminal tract without damaging it. An epididymography was also obtained, and showed, in all cases, an obstruction inside the epididymis at various levels.

In two cases the site of obstruction was surgically excised along with the terminal part of the vas, and in two cases it was by-passed by anastomosing the vas to a tubule at a point before the obstruction. Using an operating microscope with 16× magnification, a tubule suitable for anastomosis was carefully sought by checking the incised area for continuous leakage of spermatozoa. The identification of this tubule is of fundamental importance because it alone preserves continuity with the testis. The fluid was repeatedly examined for the presence of spermatozoa. Bipolar coagulation of the vessels was carefully performed. The operating field was continuously irrigated with normal saline.

The double layer anastomosis was performed under 25× magnification. The inner layer formed by the whole tubular wall and the mucosal layer of the vas was sutured with 4–5 interrupted Nylon or Vycril 11/0 sutures after the stumps were clamped with an Acland–Wiston clamp and after a few millimeters-long segment of the tubule was dissected free (fig. 1a).

To facilitate anastomosis, a stitch was placed between the epididymal tunica and the muscular layer of the vas, stabilizing the connection between the two stumps. In one case, a short 5/0 plain catgut splint was introduced into the tubule and the vas to make the correct placement of the sutures easier. (Belgrano, 1981 and 1983; Ozdiler, 1981).

The first stitch was placed in the posterior side and

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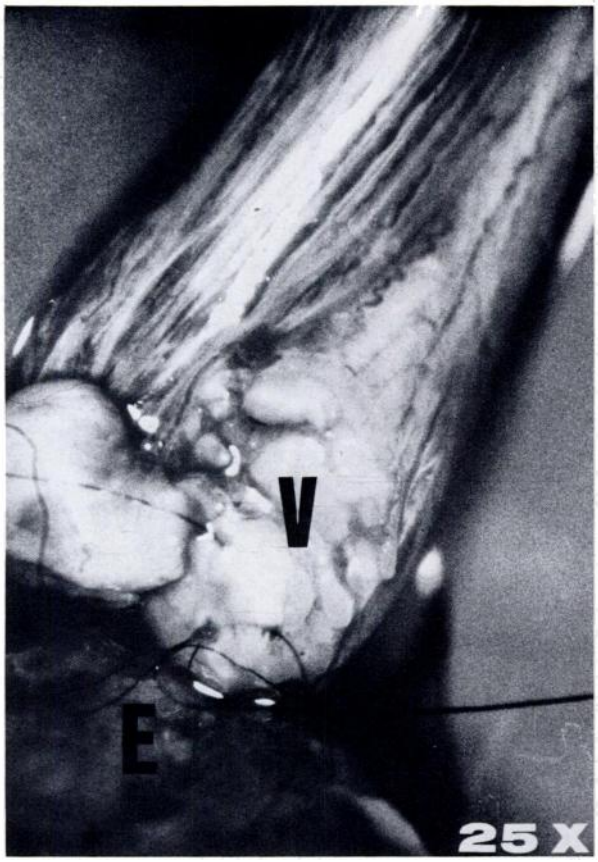

Fig. 1A. The mucosal suture is placed through the vas deferens (V), and the specific epididymal tubule with interrupted nylon or Vycril® 11/0 sutures. E = epididymis.

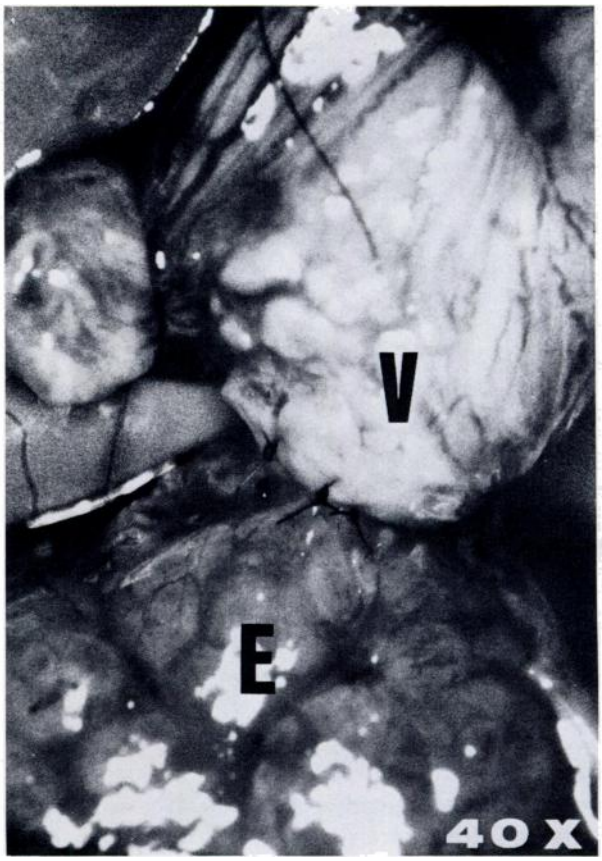

Fig. 1B. The inner layer is completed: E = epididymis; V = vas deferens.

the catgut splint was removed before tying the anterior sutures. Because of continual leakage of epididymal fluid, the lumen of the tubule had to be frequently irrigated during the entire procedure in order to have adequate visualization.

The anastomosis was then completed with 8–10 Nylon 10/0 stitches, catching the muscular layer of the vas and the tunica vaginalis of epididymis (fig. 1B) (Giuliani et al 1981; Giuliani and Carmignani, 1982). The length of time required for the surgery ranged from 45 to 130 minutes.

Case Report

Case 1

A 32-year-old man. At the age of 12 he underwent surgical exploration for a nonpalpable right testicle. As a result of this operation, a diagnosis of agenesis of the right testicle was made. He suffered from left epididymitis at the ages of 16 and 26, and was cured with antibiotics. He had been married for 7 years without offspring. Repeated sperm analysis carried out over the last two years confirmed azoospermia. A testicular biopsy showed that the germinal line was almost completely normal. The left testicle appeared slightly swollen, but of normal consistency; there was a small nodule in the tail of the epididymis probably due to the past epididymitis. The levels of LH, FSH, and T were normal. On June 18, 1982 surgery was performed. The vas was incannulated and the vasogram showed normal seminal pathways. The tail of the epididymis with the nodule was excised. Observation through the operating microscope showed the efflux of seminal fluid from one of the cut tubules; examination of this fluid revealed the presence of a large number of spermatozoa, many of which were immotile. The tubulovasostomy was performed and this operation, which was one of the first we performed, lasted 135 minutes. The patient was discharged after four days.

Case 2

A 40-year-old man. At the age of 18, he suffered from gonorrhoea with many relapses. He underwent a right epididymectomy for epididymitis. There were two recurrences of left epididymitis, the last one only one year before our examination. The patient has been married for two years without offspring. Repeated sperm analyses revealed azoospermia. During our examination, the right testicle appeared swollen, and had surgical scarring. On the left side the testicle was normal but the cauda epididymidis was larger than normal and sensitive to touch. On August 27, 1982 he underwent surgery; the testis was isolated by an infrapubic incision. The vasogram showed normal seminal pathways. After having separated the cauda epididymis from the testis, we noted the presence of an abscess localized in the tail of the epididymis. The tail of the epididymis and the adjacent portion of the vas deferens were therefore excised. After repeated sectioning of the corpus, epididymis observation through the operative microscope showed an efflux of seminal fluid from one on the cut tubules. The presence of spermatozoa, many of which were motile, was confirmed by microscopic examination. The anastomosis was performed with the same technique as in the first case. The patient was discharged after four days.

Case 3

A 29-year-old man. At the age of 21, he suffered from tubercular pleurisy. A year later he had right epididymitis with acute prostatitis. He had been married for four years and had no children. He consulted us because of azoospermia. During the physical examination we found the right testicle to be normal. On the left, the epididymis was enlarged, with a hard nodule in the caudal area. Serum LH and T were normal, FSH was at the upper limit of the normal range. Exploratory surgery was performed on August 30, 1982. The vasogram showed the right vas to be very enlarged, with a blockage at the pelvic level and a corresponding lack of visualization of the associated seminal vesicle. We excised the tail of the left epididymis and the nearby portion of the vas. The histologic diagnosis was tubercular giant cell granuloma. The anastomosis was performed at the level of the cranial zone of the left epididymis, where leakage of normal spermatozoa was noted. Chemotherapy was started immediately.

Case 4

A 30-year-old man, who had been married for five years and had no children. Semen analysis revealed azoospermia with reduced semen volume (1.8 ml). During the physical examination we found right testicular atrophy with a palpable right vas deferens. On the left, the vas deferens and cauda of the epididymis were not palpable, but the testicle was normal. Biopsy of the right testicle showed a thickened basal membrane. The histology of the left testicle was normal. LH and FSH were in the upper limits of the normal range and T was reduced. On July 24, 1983 he underwent surgery through an infrapubic incision. On the right side we found a small testicle with a normal epididymis and vas deferens. On the left, the volume and consistency of the testicle were normal and dilated tubules were visualized in the head of the epididymis. The left vas however was absent along the spermatic cord. A right vasogram showed normal findings. Spermatozoa were seen after incision of the left epididymis. We performed a cross tubulovasostomy between the right vas deferens and left epididymal tubule, passing under the penile suspension ligament with no resulting traction. At the end of operation, the testicles were easily replaced into the scrotum.

Results

In the first patient, a sperm count after three months revealed the presence of about 1,000,000 spermatozoa/ml with poor motility. The subsequent count after six months showed the presence of 40 million spermatozoa of which 60% were motile after 2 hours. The success of the operation was confirmed by the pregnancy of the patient's wife.

In the second patient a sperm count performed after three months revealed 50,000 immotile spermatozoa with many round cells. After nine months the sperm count was 1,000,000/ml with 50% motility after 2 hours.

A sperm analysis of the third patient after three months showed three to five spermatozoa per field of vision. Subsequently, after three months of gonadotropin thereapy, he had 8 million spermatozoa/ml, 10% of which had rectilinear movements. The therapy is currently being continued.

The fourth patient was seen after three months and 3 million spermatozoa/ml were found in the ejaculate, 15% of which were motile. Gonado-

tropin therapy was initiated immediately after surgery, and is currently been continued.

Discussion

From a purely theoretical point of view, tubulovasostomy is a surgical procedure capable of reestablishing a full-channel continuity between the epididymal tubule and the mucosal cylinder of the vas. The validity of this operation, however, has so far only been confirmed by Silber (1979) and a few others (Wagenknecht, 1980).

Perhaps this procedure has not been widely adopted because it requires the use of an operating microscope, microsurgical instrumentation, and experience in microsurgery. In addition, the cost of this operation is greater than for a conventional epididymo-vasostomy because it takes longer. It would seem, therefore, that its introduction into common practice could be justified by the certainty of receiving better results than those obtained by the usual surgical procedure. We do not presume to make such claims in this paper. However, we do believe that it deserves consideration because the cases we have presented give undeniable evidence of the patency of the anastomosis. The presence of spermatozoa in the ejaculate of previously azoospermic patients who underwent single anastomosis shows that this operation can achieve anatomic patency of the anastomosis in 100% of the cases.

The fact that fertility has been proved conclusively in only one patient is of relative importance in our opinion, as all patients underwent surgery as a last resort. Moreover, the brief follow-up period leads us to hope that the number and quality of spermatozoa in the other three patients will gradually show similar improvements.

References

Audebert A, Cittadini E, Cognat M, Schoysman R. Microsurgery in infertility. Cofese Edizioni Palermo 1980.

Belgrano E, Carmignani G, Puppo P, Gaboardi F. Microchirurgia della via seminale maschile estratto da: problematiche diagnostiche e terapeutiche in fisiopatologia della riproduzione. 1981; 571–583, Pacini, editore, Roma.

Belgrano E, Carmignani G, Puppo P, Gaboardi F, Trombetta C. Tubulovasostomy in the rat: a new experimental study. J Androl 1983; 4:253–255.

Giuliani L, Belgrano E, Carmignani G, Puppo P. Microsurgery in urology. Int Surg 1981; 66:41–45.

Giuliani L, Carmignani G. Microchirurgia in urologia. Piccin editore, Padova, 1982.

Ozdiler E, Kelâmi A. Microscopical splint epididymo-vasostomy. Eur Urol 1981; 7:81–84.

Silber SJ. Microscopic vaso-epididymostomy: specific microanastomosis to the epididymal tubule. Fertil Steril 1978; 30:565–570.

Silber SJ. Microsurgery. Baltimore: Williams and Wilkins, 1979.

Wagenknecht LV, Klosterhalfen H, Schirren C. Microsurgery in andrologic urology: I. Refertilization. J Microsurg 1980; 1:370–376.

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