CHAPTER 12

Surgical Management of Male Infertility

Sherman J. Silber

Surgical Management of Male Infertility

Diagnosis and Treatment of Obstructive Azoospermia
- Vasectomy Reversal
- Microsurgical Vasoepididymostomy
- Evaluation of Obstruction Not Caused by Vasectomy
- Inguinal Disruption of Vas Deferens After Herniorrhaphy
- Ejaculatory Duct Obstruction
- Congenital Absence of Vas Deferens

Microsurgery for Undescended Testicle
- Rationale for Testicle Autotransplantation
- Microsurgical Techniques

Conclusions

DIAGNOSIS AND TREATMENT OF OBSTRUCTIVE AZOOSPERMIA

Vasectomy Reversal

Vasectomy is the most common cause of obstructive azoospermia. There are three major aspects to vasectomy reversal. The first concerns techniques for obtaining a reliable reanastomosis of the vas deferens. With modern microsurgery, accurate reanastomosis should be achievable in almost every case. The second aspect relates to the detrimental secondary effects of vasectomy, such as pressure-induced epididymal damage as a secondary result of vasectomy. The third aspect concerns microsurgically bypassing this secondary epididymal obstruction.

Microsurgical Approach. It is advisable to practice in animals before doing such surgery on humans.[1–12] For the best mucosal approximation in the human where lumina are of different diameter (because of chronic obstruction and increased pressure), I recommend a nonsplinted, two-layer approach (Fig. 12–1). A one-layer anastomosis provides poorer mucosal approximation when lumen diameters differ. A splint of any kind should never be used, and is only an excuse for not being certain one has obtained a good anastomosis. It results in sperm leakage, inflammation, and more scarring.

It is not necessary to determine preoperatively what type of vasectomy was performed. Often a very large segment has been removed, and in the majority of cases that we have come across, the vasectomy has extended well into the convoluted portion. Such cases would have been considered impossible to correct with conventional techniques. With microsurgical techniques, they merely require a little more dissection, but essentially no change from a standard routine.

The preparation of the two ends of the vas deferens microscopic anastomosis is best performed with X 2½ loupe magnification. The healthy ends above and below the fibrosis are freed up several centimeters, and often more than that if a large gap has to be bridged. The more one frees up healthy tissue from surrounding attachments, the more easily the two ends will bridge any gap between them. As it is critical to have a tension-free anastomosis, no effort at anastomosis should be made until the ends above and below the obstruction have been adequately freed up. One generally need not fear devascularizing the vas deferens. The blood supply around the

Figure 12–20. The blanched testicle before the vascular clamps are removed. It lies on the groin but is now free to be transferred to the scrotum.

CONCLUSIONS

Preoperative diagnosis and localization of the high intraabdominal testis is most reliably and easily accomplished by laparoscopy. These high testicles are best placed into the scrotum by dividing the spermatic vessels. Microsurgical reanastomosis to the inferior epigastric vessels is recommended to prevent partial or complete testicular atrophy, and to maximize the eventual prospect for fertility. Because we know that adults with bilateral cryptorchidism can recover fertility after the testes are placed in the scrotum, it is important not to compromise blood supply in the mistaken notion that these testicles are not very good anyway. There certainly is some hope for fertility if orchidopexy is performed with proper attention to blood supply.

REFERENCES

1. Silber SJ: Microscopic technique for reversal of vasectomy. *Surg Gynecol Obstet* 143:630, 1976.
2. Silber SJ: Perfect anatomical reconstruction of vas deferens with a new microscope surgical technique. *Fertil Steril* 28:72, 1977.
3. Silber SJ, Galle J, Friend D: Microscopic vasovasostomy and spermatogenesis. *J Urol* 117:299, 1977.
4. Silber SJ, Crudop J: Kidney transplantation in inbred rats. *Am J Surg* 125:551, 1973.
5. Silber SJ, Crudop J: A three kidney rat model. *Invest Urol* 11:466, 1974.
6. Silber SJ, Malvin RL: Compensatory and obligatory renal growth in rats. *Am J Physiol* 226:114, 1974.
7. Silber SJ: Growth of baby kidneys transplanted into adults. *Arch Surg* 111:75, 1976.
8. Silber SJ: Transplantation of rat kidneys with acute tubular necrosis into salt-loaded and normal recipients. *Surgery* 77:487, 1975.
9. Silber SJ: Successful autotransplantation of an intra-abdominal testicle to the scrotum using microvascular anastomosis. *J Urol* 115:452, 1976.
10. Silber SJ: Compensatory and obligatory renal growth in babies and adults. *Aust NZ J Surg* 44:421, 1974.
11. Silber SJ: Microscopic vasectomy reversal. *Fertil Steril* 28:1191, 1977.
12. Silber SJ: Vasectomy and vasectomy reversal. *Fertil Steril* 29:125, 1978.
13. Silber SJ: *Reproductive Microsurgery*. Baltimore, Williams & Wilkins, 1984.
14. MacLeod J, Gold RZ: The male factor in fertility and infertility. IV. Sperm morphology in fertile and infertile marriage. *Fertil Steril* 2:394, 1951.
15. Silber SJ, Rodriguez-Rigau LJ: Quantitative analysis of testicle biopsy: Determination of partial obstruction and prediction of sperm count after surgery for obstruction. *Fertil Steril* 36:480, 1981.
16. Silber SJ: Epididymal extravasation following vasectomy as a cause for failure of vasectomy reversal. *Fertil Steril* 31:309, 1979.
17. Bedford JM: Adaptation of the male reproductive tract and the rate of spermatozoa following vasectomy in the rabbit, rhesus monkey, hamster and rat. *Biol Reprod* 14:118, 1976.
18. Silber SJ: Microscopic vasoepididymostomy, specific microanastomosis to the epididymal tubule. *Fertil Steril* 30:565, 1978.
19. Silber SJ: Vasoepididymostomy to the head of the epididymis: Recovery of normal spermatozoa motility. *Fertil Steril* 34:149, 1980.
20. Silber SJ: Reversal of vasectomy in the treatment of male infertility. *J Androl* 1:261, 1980.
21. Silber SJ: Reversal of vasectomy in the treatment of male infertility: Role of microsurgery, vasoepididymostomy, and pressure-induced changes of vasectomy. *Urol Clin North Am* 8:53, 1981.
22. Charny CW: Testicular biopsy: Its value in male sterility. *JAMA* 115:1429, 1940.
23. Nelson WO: Interpretation of testicular biopsy. *JAMA* 151:1449, 1953.
24. Mannion RA, Cottrell TLC: Correlation between testicular biopsy and sperm count. *J Urol* 85:953, 1961.
25. Albert A: The mammalian testis, in Young WC (ed): *Sex and Secretions*, ed 3. Baltimore, Williams & Wilkins, 1961, vol 1, p 305.

26. Heller CG, Clermont Y: Kinetics of the germinal epithelium in man. *Recent Prog Horm Res* 20:545, 1964.
27. Steinberger E, Tjioe DY: A method for quantitative analysis of human seminiferous epithelium. *Fertil Steril* 19:960, 1968.
28. Tjioe DY, Steinberger E, Paulsen CA: A simple method for quantitative analysis of seminiferous epithelium in human testicular biopsies. *J Albert Einstein Med Center* 15:56, 1967.
29. Zuckerman Z, Rodriquez-Rigau LJ, Weiss DB, et al: Quantitative analysis of the seminiferous epithelium in human testicular biopsies, and the relation of spermatogenesis to sperm density. *Fertil Steril* 30:448, 1978.
30. DeKretser DM, Burger HG, Hudson B: The relationship between germinal cells and serum FSH levels in males with infertility. *J Clin Endocrinol Metab* 38:787, 1974.
31. Schoysman R: "Operative Treatment of Ductal Obstruction and/or Agenesis" Presented at the meeting of the American Fertility Society, Miami Beach, April 1977.
32. Schoysman R, Drouart JM: Progrès récents dans la chirurgie de la stérilité masculine et feminine. *Acta Clin Belg* 71:261, 1972.
33. Amelar RD, Dubin L: Commentary of epididymal vasostomy, vasovasostomy and testicular biopsy, in *Current Operative Urology*. New York, Harper & Row, 1975, pp 1181–1185.
34. Hanley HG: The surgery of male sub-fertility. *Ann R Coll Surg* 17:159, 1955.
35. Hotchkiss, RS: Surgical treatment of infertility in the male, in Campbell MF, Harrison HH (eds): *Urology*, ed 3. Philadelphia, Saunders, 1970, p 671.
36. Silber SJ: Pregnancy caused by sperm from vasa efferentia. *Fertil Steril*, in press. 49: xx, 1988.
37. Silber SJ: Results of specific tubule vasoepididymostomy: the role of epididymis in sperm maturation. *Human Reproduction*, Volume 4: xx, 1989.
38. Silber SJ: Apparent fertility of human sperm from the caput epididymis. *J Androl*, in press.
39. Gaddum P: Sperm maturation in the male reproductive tract: Development of motility. *Anat Rec* 161:47, 1969.
40. Bedford JM: Development of the fertilizing ability of spermatozoa in the epididymis of the rabbit. *J Exp Zool* 163:312, 1966.
41. Orgebin-Crist MC: Sperm maturation in rabbit epididymis. *Nature* 216:816, 1967.
42. Glover TD: Some aspects of function in the epididymis. Experimental occlusion of the epididymis in the rabbit. *Int J Fertil* 14:215, 1969.
43. Gaddum P, Glover TD: Some reactions of rabbit spermatozoa to ligation of the epididymis. *J Reprod Fertil* 9:119, 1965.
44. Paufler SK, Foote RH: Morphology, motility and fertility in spermatozoa recovered from different areas of ligated rabbit epididymis. *J Reprod Fertil* 17:125, 1968.
45. Orgebin-Crist MC: Studies of the function of the epididymis. *Biol Reprod* 1:155, 1969.
46. Silber SJ: *Transurethral Resection*. New York, Appleton-Century-Crofts, 1977.
47. Porch PP Jr: Aspermia owing to obstruction of distal ejaculatory duct and treatment by transurethral resection. *J Urol* 119:141, 1978.
48. Silber SJ, Asch R, Ord T, Borrero C, Balmaceda J: New treatment for infertility due to congenital absence of vas deferens. *Lancet* 2:850, 1987.
49. Devroey P, Braeckmans P, Smits, et al: Pregnancy after translaparoscopic zygote intrafallopian transfer in a patient with sperm antibodies. *Lancet* 1:1329, 1986.
50. Girgis SM, Etriby AN, Ibrahim AA, Kahil SA: Testicular biopsy and azoospermia. A review of the last ten years' experience in over 800 cases. *Fertil Steril* 20:467, 1969.
51. Orgebin-Crist MC: Studies of the function of the epididymis. *Biol Reprod* 1:155, 1969.
52. Levitt SB, Kogan SJ, Engel RM, et al: The impalpable testis: A rational approach to management. *J Urol* 120:515, 1978.
53. Weiss RM, Glickman MG, Lytton B: Clinical implications of gonadal venography in the management of the non-palpable undescended testis. *J Urol* 121:745.
54. Clatworthy NW, Hallenbaugh RS, Grossfeld JL: The long-louped vas orchidopexy for the high undescended testis. *Am Surg* 38:69, 1972.
55. Fowler R, Stephens FD: The role of testicular vascular anatomy in the salvage of high undescended testes, in Stephens FD (ed): *Congenital Malformations of the Rectum, Anus, and Genital Urinary Tract*. London, Livingstone, 1963, pp 306–320.
56. Gibbons MD, Cromie WJ, Duckett JW Jr: Management of the abdominal undescended testicle. *J Urol* 122:76, 1979.
57. Martin DC: The undescended testis: Evolving concepts in management. *Urol Dig* 1977.
58. Cohen R, Silber SJ: Laparoscopy for cryptorchidism. *J Urol* 124:928, 1980.
59. Silber SJ: The intra-abdominal testis: microvascular autotransplantaton. *J Urol* 125:329, 1981.
60. Silber SJ, Kelly J: Successful auto-transplantation of an intra-abdominal testis to the scrotum by microvascular technique. *J Urol* 115:452, 1976.
61. Campbell HE: Incidence of malignant growth of the undescended testicle: A critical and statistical study. *Arch Surg* 44:353, 1942.
62. Martin DC, Menck HR: The undescended testis: Management after puberty. *J Urol* 114:77, 1975.
63. Atkinson PM, Epstein MT, Rippon AE: Plasma gonadotropins and androgens in the surgically treated cryptorchid patient. *J Pediatr Surg* 10:27, 1975.
64. Altwein JE, Gittes RF: Effect of cryptorchidism and casteration on FSH and LH levels in the adult rat. *Invest Urol* 10:167, 1972.
65. Hadziselemovic F, Herzag B, Seguchi H: Surgical correction of cryptorchidism at two years: Electron microscopic and morphologic investigations. *J Pediatr Surg* 10:19, 1975.
66. Kiesewetter WB, Shull WR, Fetterman GH: Histologic changes in the testis following the anatomically successful orchidopexy. *J Pediatr Surg* 4:59, 1969.
67. Mengel W, et al: Studies on cryptorchidism: A comparison of histologic findings in the germinative epithelium before and after the second year of life. *J Pediatr Surg* 9:445, 1974.
68. Nelson WO: Mammalian spermatogenesis, effect of experimental cryptorchidism in the rat, and nondescent of the testis in man. *Recent Prog Horm Res* 6:29, 1951.
69. Sohval AR: Testicular dysgenesis as an etiologic factor in cryptorchidism. *J Urol* 72:693, 1954.
70. Britton BJ: Spermatogenesis following bilateral orchidopexy in adult life. *Br J Urol* 47:464, 1975.
71. Comhaire F, Derom F, Vermeulen L: The recovery of spermatogenesis in an azoospermic patient after operation for bilateral undescended testes at age of 25 years. *Int J Androl* 1:117, 1978.
72. Silber SJ: Recovery of spermatogenesis after testicle autotransplantation in an adult male. *Fertil Steril* 38:632, 1982.
73. Bevan AD: The surgical treatment of undescended testicle: A further contribution. *JAMA* 41:718, 1903.24.
74. Moschowitz AV: The anatomy and treatment of undescended testes, with special reference to the Bevan operation. *Ann Surg* 52:821, 1910.
75. Mixter EG: Undescended testicle: Operative treatment and end results. *Surg Gynecol Obstet* 39:275, 1924.
76. Wangenstein OH: Undescended testes: Experimental and clinical study. *Arch Surg* 14:653, 1927.
77. McCollum DW: Clinical study of spermatogenesis of undescended testicles. *Arch Surg* 31:290, 1935.
78. Silber SJ: Transplantation of human testis for anorchia. *Fertil Steril* 30:181, 1978.