

Erection- and Ejaculation-Preserving Cystectomy With Orthotopic Urinary Diversion: Is It Feasible?

CENGİZ GIRGIN, MEHMET ODER, M. OGUZ SAHIN, AKIF SEZER, SERDAR BERKMEN, RUSEN AYDIN, AND CETIN DINCEL

From the Department of Urology Clinic, Ataturk Research and Training Hospital, Izmir, Turkey.

ABSTRACT: Nerve-sparing techniques to preserve sexual function in men undergoing cystoprostatectomy have been documented by different centers. We evaluated the results of the first 4 erection- and ejaculation-preserving cystectomies performed in our department. The ages of patients ranged between 36 and 43 years. In all cases, patients wished to maintain sexual function. Of the cases, 3 patients had pT1 G3 transitional cell carcinoma (TCC) refractory to treatment and one had pT2a adenocarcinoma of the bladder. Extirpation of the bladder and anterior proximal prostate en bloc with preservation of the vasa deferentia, seminal vesicles, posterior prostate, and neurovascular bundles was performed after pelvic lymphadenectomy. W-ileal neobladder was performed by using 40 cm of ileum. All patients had erections at the third month. Of the cases, 2 patients had antegrade ejaculation. The ejaculate volumes were 0.8

and 1.2 mL in patients with antegrade ejaculation. Patients in the other cases had retrograde ejaculation. All patients were continent day and night. We started clean intermittent catheterization in 1 case because of residual urine. There were no local recurrences. One patient with TCC died because of systemic disease in the postoperative 32nd month. The most important drawback of potent cases in cystectomy decision is erectile dysfunction after radical cystectomy. This drawback causes delay of the operation and sometimes mortality. As was the case in other reports, our limited number of cases in this study demonstrated that erection and ejaculation could be preserved in selected groups of patients.

Key words: Bladder cancer, treatment, sexual function, prognosis.
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The orthotopic urinary diversion procedures after radical cystectomy have evolved in the last decade, and reconstructions similar to natural bladder function are performed more frequently today. Even though storage and emptying could be maintained by orthotopic urinary diversions, the most important drawback in potent patients in cystectomy decisions is erectile dysfunction after radical cystectomy. Schlegel and Walsh (1987) described the relationship of the cavernous nerves to the bladder and seminal vesicles and reported that preservation of potency in 40% of 25 patients undergoing nerve-sparing radical cystectomy. Schoenberg et al (1996) have updated the Hopkins series, reporting outcomes for 101 patients with preservation of one or both neurovascular bundles. Potency was evaluable in 78 patients, and 33 (42%) maintained erections satisfactory for intercourse (Schoenberg et al, 1996).

Even though sexual potency can be preserved in highly selected patients, radical cystoprostatectomy eliminates functional fertility in men by removing the accessory sexual glands necessary for ejaculation. Intracytoplasmic

sperm injection (ICSI) after testicular sperm extraction (TESE) is the only reasonable option for young men who desire fatherhood after radical cystoprostatectomy. In appropriately selected men who require cystectomy (and for whom potency and fertility are strongly relevant issues) and in whom complete prostatic removal is not necessarily mandated by the primary pathological condition, Spitz et al (1999) have devised a new technique of radical cystectomy with preservation of the vasa deferentia, seminal vesicles, posterior prostate, and neurovascular bundles. In this article, we evaluated the outcomes of erection- and ejaculation-preserving cystectomies performed in a manner similar to this technique within our department.

Materials and Methods

We performed 4 erection- and ejaculation-preserving cystectomy and orthotopic urinary diversion procedures from September 1999 to June 2002. The ages of patients ranged from 36 to 43 years, with a mean age was 39 years. Patients in all cases strongly wished to maintain sexual and ejaculation functions. Of the 4 patients, 3 had cT1 G3 transitional cell carcinoma (TCC) refractory to intravesicle bacille Calmette-Guérin (BCG) treatment and one had cT2a adenocarcinoma of the bladder. None of the patients with TCC had concomitant carcinoma in situ. The prostatic urethra biopsies in TCC cases were performed before radical cystectomy by transurethral resection (TUR), and none of the patients had tumors at the prostatic urethra. The urethral surgical

Correspondence to: Dr Cengiz Girgin, Huzur Mah Gunaydin Sok, Seymen Apt No 3, Daire 19, Narlidere/Izmir, Turkey (e-mail: girgincengiz@hotmail.com).

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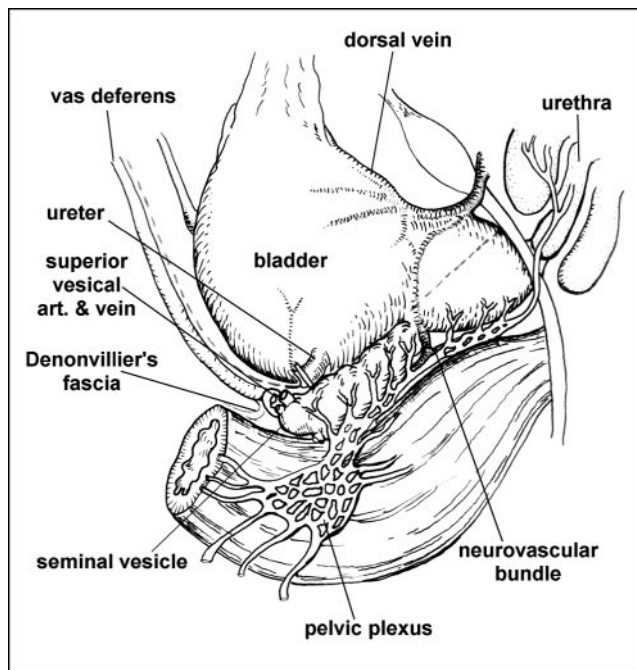


Figure 1. The plane of dissection between the anterior surface of the vesicula seminalis and the posterior surface of the bladder prevents damage to the pelvic plexus, which lies behind the seminal vesicles.

margin frozen sections were performed in all cases during operation before the constitution of W-ileal neobladder. All frozen sections performed during the operation were negative.

Limited pelvic lymphadenectomy was performed through a midline incision before cystectomy in all cases. Care was taken to preserve the ureters and vasa deferentia. The extirpation of the bladder and anterior proximal prostate en bloc with preservation of the vasa deferentia, seminal vesicles, posterior prostate, and neurovascular bundles was performed after pelvic lymphadenectomy, as described by Spitz et al (1999) (Figure 1). The prostatic stroma was sharply incised anteriorly to the level of the urethra. Prostatic transection was continued posterior to ensure that it remained proximal to the ejaculatory ducts. The whole bladder and proximal prostatic cuff were then removed en bloc, and frozen section analysis of the prostatic margin was done intraoperatively. Thus, the seminal vesicles and vasa deferentia remained exposed with completely intact neurovascular bundles, which were spared significant dissection (Spitz et al, 1999). Then running 3/0 chromic suture was placed circumferentially between urethral mucosa and prostatic stroma, incorporating the urethra and prostatic stroma to control bleeding and subsequent anastomosis of the ileal reservoir (Figure 2).

The W-ileal neobladder was performed by using 40 cm of ileum and the technique described by Hautmann et al (1998). The uretero-ileal reimplantation was performed by serous lined extramural tunnel technique, as described by Abol-Enein and Ghoneim (1994, 1995). Then ileal reservoir anastomosis to the urethra was performed using four 3/0 polyglactin sutures at the 3, 6, 9, and 12 o'clock positions. A Foley catheter was placed when the reservoir was anastomosed to the prostatic urethra. The

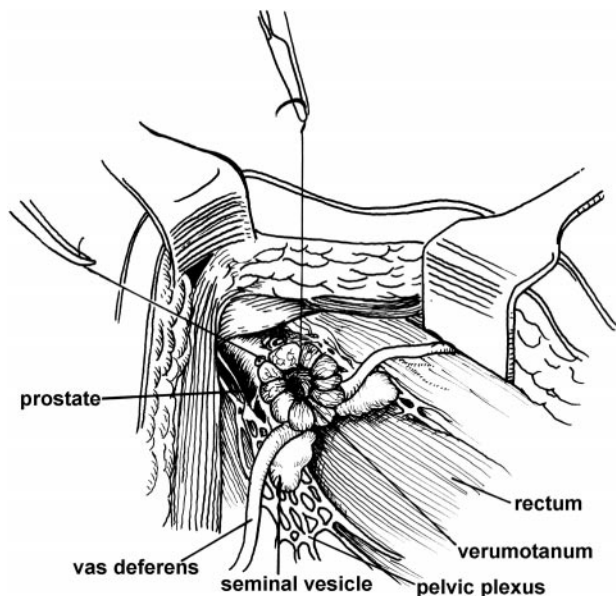


Figure 2. Preparing posterior urethra and prostate for anastomosis with running 3/0 chromic suture placed circumferentially.

ureteral stents were removed 10 days after the operation, and the urethral catheters were removed 21 days after the operation.

All patients were seen postoperatively at 3-month intervals for the first year, at 6-month intervals for the second year, and annually thereafter. Follow up consisted of routine blood chemistry studies, abdominal ultrasonography, and urine cytology. Radiographic evaluations consisted of chest x-ray and abdominal computed axial tomography every 6 months for 3 years and annually thereafter. The continence rates and sexual and ejaculatory functions were evaluated 3 months after surgery. Urinary leakage, defined as use of 1 or fewer pads per day, was considered to represent continence.

Results

There was no perioperative morbidity, and all catheters were removed on the postoperative 21st day. Three patients had pT1NO G3 TCC and one patient had pT2aNO adenocarcinoma of the bladder in the final pathological evaluation. All patients had negative surgical margins, including the prostatic margin, at cystectomy. The follow-up period was 6, 28, 32, and 35 (mean: 25.25) months, respectively, in the 4 cases. None of the patients demonstrated local recurrence. One patient with TCC died because of systemic disease (bone and pulmonary metastases) at the 32nd month.

Patients in all cases voided without difficulty and had normal sensation of the distended neobladder following catheter removal. All patients were continent day and night at the postoperative third month. Clean intermittent catheterization (CIC) was started in 1 case because of

Results of erection- and ejaculation-sparing cystectomy in different centers

	Continence (%)	Erection (%)	Antegrade Ejaculation	Retrograde Ejaculation	Pregnancy
Spitz et al (1999) (n = 4)	100	100	3/4	1/4	1
Colombo et al (2001) (n = 8)	100	100	4/8	4/8	0
Present study (n = 4)	100	100	2/4	2/4	0

residual urine volume of 350 mL at the postoperative 14th month.

All patients had erections for satisfactory sexual intercourse at the postoperative third month. Of the patients, 2 had antegrade ejaculations. The ejaculate volumes were 0.8 and 1.2 mL in cases with antegrade ejaculation. The other patients had retrograde ejaculation. The microscopic evaluation revealed spermatozoa in the ejaculates of patients with antegrade ejaculation. The spermatozoa were observed in the urine after ejaculation in patients with retrograde ejaculation.

Discussion

In most countries the standard surgical treatment for organ-confined invasive bladder cancer is radical cystoprostatectomy with limited pelvic lymphadenectomy. Also, high-risk superficial tumors such as BCG-resistant T1 GIII and Tis are treated by radical cystoprostatectomy in some centers. The 5-year survival rates after radical cystectomy for patients with stages pT1, pT2, pT3, and pT4 NO disease are approximately 75%–83%, 63%–87%, 31%–62%, and 21%–50%, respectively. Five-year disease-free survival for patients with regional lymph node metastases varies between 5% and 35% depending on the extent of lymph node involvement (Pagano et al, 1991; Soloway et al, 1994; Evans and Swanson, 1996; Stein et al, 2001). These encouraging results have persistently displayed how best to replace the original bladder removed in treating either benign or malignant diseases.

The orthotopic neobladder substitution seems to be the ideal form of urinary diversion available today. Although advances in urinary diversion have provided patients with a more normal lifestyle, with an improved self-image, following removal of the bladder, loss of sexual function and fertility are still important problems after radical cystoprostatectomy. The nerve-sparing radical cystoprostatectomy techniques provided for the preservation of erections in 40%–45% of cases in the most experienced hands (Schlegel and Walsh, 1987; Schoenberg et al, 1996; Venn et al, 1998). The seminal vesicle-preserving techniques in radical prostatectomy operations demonstrated that improved urinary continence rates and incomplete resection of seminal vesicles did not change the oncological outcome (Korman et al, 1996; John and Hauri, 2000). Sim-

ilar to radical prostatectomy series, capsule or seminal vesicle-sparing radical cystoprostatectomy techniques provided better continence and erection rates (Light and Scardino, 1986; Turner et al, 1997; Spitz et al, 1999; Colombo et al, 2001; Ghanem, 2002). The reported oncological outcome of these techniques was reasonable, and preservation of seminal vesicles and part of the prostate gland did not alter the oncological outcome.

The mean age of patients in our 4 cases was 39 years, and patients in all cases strongly wished to maintain sexual and ejaculation functions. All 4 patients were continent after removal of the urethral catheter. This high continence rate was similar to that reported with the seminal- and erection-sparing techniques (Table). Most authors (Turner et al, 1997; Spitz et al, 1999; Colombo et al, 2001) believe that nerve- or seminal-sparing cystectomy techniques are associated with improved urinary continence after orthotopic bladder substitution. The technique we used not only spares neurovascular bundles but also preserves the apical and posterior prostate tissue. The preservation of this tissue would enhance urinary continence rates, but the risk of urinary retention or high-volume residual urine might increase. Despite the reported studies in the literature, one of our patients (25%) started CIC because of high-volume residual urine 14 months after the operation. This patient in this case had normal voiding patterns and residual urine of less than 100 mL in the postoperative first year. We believe that apical prostatic tissue left behind might cause a slight increase in the residual urine volumes when compared with standard technique of radical cystectomy.

We also attempted to preserve ejaculation function in our cases, and sparing of the vasa deferentia, vesicula seminalis, and posterior prostate resulted in 100% erection rates 3 months after the operation. All of our 4 patients demonstrated erections satisfactory for sexual intercourse, similar to the results in the reported studies in the literature (Table). The erection rates were improved by preservation of seminal vesicles in these reports when compared with the results of nerve-sparing radical cystoprostatectomy techniques (Spitz et al, 1999; Colombo et al, 2001). We believe that a plane of dissection between the anterior surface of vesicula seminalis and the posterior surface of the bladder prevented damage to the pelvic plexus, which lies behind the seminal vesicles. Also, both neurovascular bundles, which lie posterolaterally to the

prostate, were spared safely by preservation of the apical and posterior prostate (Figure 1). The results of the present study demonstrated that the erection- and ejaculation-preservation technique had excellent sexual functional results in a selected group of patients, which could be attributable to the prevention of damage to the pelvic plexus and both neurovascular bundles.

Even though sexual potency can be preserved in highly selected patients, radical cystoprostatectomy eliminates functional fertility in men by removing the accessory sexual glands necessary for ejaculation. TESE and ICSI provide the only reasonable option for young men who desire fatherhood after radical cystoprostatectomy. In appropriately selected men who require cystectomy, and for whom potency and fertility are strongly relevant issues, ejaculation and fertility functions can be preserved with the technique described by Spitz et al (1999). The antegrade ejaculation function was preserved in 2 patients with this technique in our study group. Both patients had hypovolemic ejaculate, but spermatozoa were present. Colombo et al (2001) reported a higher rate of retrograde ejaculation, similar to that observed in our cases (Table). The analysis of semen retrieved from the urine after masturbation revealed fertility potential. The TUR biopsy of the prostate in our cases and complete TURP in the series of Colombo et al might be responsible for this higher rate of retrograde ejaculation. Spitz et al (1999) performed erection and ejaculation function-preserving technique in nontransitional cell tumors of the bladder and had not performed preoperative prostatic urethra biopsies. One of their 4 patients fathered a child (Spitz et al, 1999). Even though none of our patients attempted to father a child, our patients had fertility potential and can be managed by ICSI without TESE. Though preoperative prostatic urethra biopsies might cause retrograde ejaculation, these should not be omitted in TCC patients who have risk of concomitant TCC of the prostatic urethra.

The main objective of cancer treatment is eradication of the tumor, and there is concern about the oncological outcome of nerve-sparing cystectomy techniques. None of our patients demonstrated pelvic or urethral recurrence after erection- and ejaculation-preserving cystectomy in the mean follow-up period of 25 months. One patient died because of metastatic disease 32 months after his operation. The pelvic recurrence rates were similar to those associated with radical cystectomy in reported nerve-sparing cystoprostatectomy series. Brendler et al (1990) concluded that the nerve-sparing modifications do not compromise cancer control and that local recurrence and survival rates are at least comparable to those achieved with standard radical cystoprostatectomy. In addition, reported nerve- and seminal-sparing cystectomy series demonstrated excellent local cancer control rates both in TCC and non-TCC bladder tumors (Spitz et al, 1999; Colombo et

al, 2001). These results and our experience indicate that preservation of seminal vesicles and the posterior portion of the prostate gland did not compromise local cancer control rates.

The most important drawback of potent cases with regard to the cystectomy decision is erectile dysfunction after radical cystectomy. This drawback causes delay of the operation and sometimes mortality. Our study and several studies in the literature demonstrated that erection and ejaculation could be preserved without compromising the oncological outcome of cases. The preservation of the vasa deferentia, seminal vesicles, posterior prostate, and neurovascular bundles in our cases resulted in excellent continence, potency rates, and antegrade ejaculation in the half of cases. As was the case in other reports, our limited number of cases in this study demonstrated that erection and ejaculation could be preserved after cystectomy in selected groups of patients and that erection- and ejaculation-preserving technique is feasible in both TCC and non-TCC patients who desire to maintain sexual and ejaculation functions.

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