

Preservation of Ejaculatory and Erectile Function after Radical Cystectomy for Urothelial Malignancy

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ABSTRACT

Background: During treating cancer patients, sexual issues should not be forgotten. With increasing survival from urologic cancer, quality of life and quality of sexuality have become very important targets in treating those patients. Fertility to those patients who desire fatherhood is sometimes more important than cancer morbidity, especially young patients in the rural areas in our country, to the extent that they may refuse the operation. We describe a new technique to preserve the erectile function and antegrade ejaculation after radical cystectomy.

Patients and Methods: Seven potent men with a median age of 40 years (range 35-50) presented with invasive transitional cell carcinoma (TCC) of the lateral or the anterior bladder wall. All patients wished to preserve the ejaculatory function and fertility potential. We described the surgical technique of nerve sparing radical cystectomy with preservation of the vas deferens, seminal vesicles, whole prostate and neurovascular bundles. The follow up period ranged from six months to three years (mean 20 months) to assess recurrence, erectile function and ejaculatory function.

Results: Erectile function is normal in all patients with satisfactory sexual intercourse. Antegrade ejaculation was documented in six cases. One of them fathered a child. No local or distant recurrence was detected in the seven patients at the last follow-up.

Conclusion: The technique of radical cystectomy (with preservation of the vas deferens, whole prostate and seminal vesicle) is a good option in selected young men with bladder carcinoma in whom preservation of fertility is desirable.

Key Words: Cancer bladder - Cystectomy - Erectile function - Ejaculation - Fertility.

INTRODUCTION

The main goal of cancer bladder treatment is cancer control, the sexual issue is a secondary concern. Preservation of sexual function in men undergoing radical cystectomy is well estab-

lished [1]. Removal of the vas deferens and the seminal vesicle will eliminate the fertility potential which is the main concern in many men undergoing radical cystectomy, particularly young patients with cancer bladder coming from the rural areas in our country. All techniques described for preservation of the fertility potential faced the problem of retrograde ejaculation in most cases with the need for cryopreserved sperms and expensive IVF techniques [2-8]. We present a modified technique of radical cystectomy with preservation of the erectile function and antegrade ejaculation.

METHODS

From January 2003 to June 2005, we performed modified radical cystectomy with urinary diversion in seven men with age range from 35 to 50 years (median 40 yrs) at the departments of urosurgery; Kasr El Einy Hospital, French Teaching Hospital and El-Mabarra Hospital, Cairo. The indication for surgery was monofocal invasive TCC of the lateral or the anterior bladder wall. All patients were potent preoperatively and asked for preservation of fertility and ejaculatory function. Preoperative staging included history, physical examination, estimation of prostatic specific antigen (PSA), digital rectal examination (DRE), transrectal ultrasound (TRUS), chest X-ray, intravenous pyelography (IVP), CT and cystoscopic biopsy. Biopsies from the rest of the bladder mucosa, bladder neck and prostatic urethra should be free of tumour.

All our patients had solitary tumours away from the trigone and bladder neck with negative random biopsies from the rest of the bladder

mucosa and prostatic urethra, in addition to free frozen section taken at the time of the operation from the proximal prostatic urethra. We used the standard nerve sparing radical cystectomy technique. Care was taken to preserve the sympathetic nerves overlying the bifurcation of the aorta extending over the sacral promontory to the hypogastric plexus.

The ureters were traced down into the deep pelvis where the obliterated umbilical and superior vesical arteries were ligated (or clipped) and divided. The ureters were divided distally near the entrance into the posterior bladder wall. Care was taken to preserve the vas deferens (VD) which was dissected and traced till the peritoneal cul-de-sac and the peritoneum was divided. Identification of the seminal vesicle (SV) identified the proper plane of dissection. The dissection was continued anterior to the seminal vesicles till the base of the prostate (Fig. 1). Branches of the inferior vesical arteries were ligated (or clipped) and divided. The base of the prostate was dissected off the bladder neck (as the case in radical retropubic prostatectomy) [9] (Fig. 2). Mild traction on the catheter identified the prostatovesical junction anteriorly. A plane of dissection was created between the bladder base and the base of the prostate with sharp dissection anteriorly till the connection

between them was the Foley catheter at the bladder neck, then the mucosa at the bladder neck was incised around the catheter, the catheter extracted, clipped by an artery clamp then incised distal to the artery clamp to make mild traction on the bladder (Fig. 3). The rest of the bladder attachments were clipped and ligated and the bladder was removed. Care was taken to avoid injury of the neurovascular bundles on both sides. After taking frozen sections from the proximal prostatic urethra, it was completely closed by sutures for hemostasis and to avoid retrograde ejaculation (Fig. 3). The diversion was ureterocolic in 5 cases and ileal conduit in two cases.

Patients were followed up at three-month intervals to assess the erectile and ejaculatory functions and to assess any recurrent disease in the pelvis.

Follow-up included: history, clinical examination, PSA, DRE and TRUS, chest X-ray, abdominal ultrasound and pelvic CT.

Potency was defined as the ability to attain and maintain an erection sufficient for satisfactory sexual intercourse. Fertility was considered possible when spermatozoa were detected in the semen analysis after sexual intercourse or masturbation.

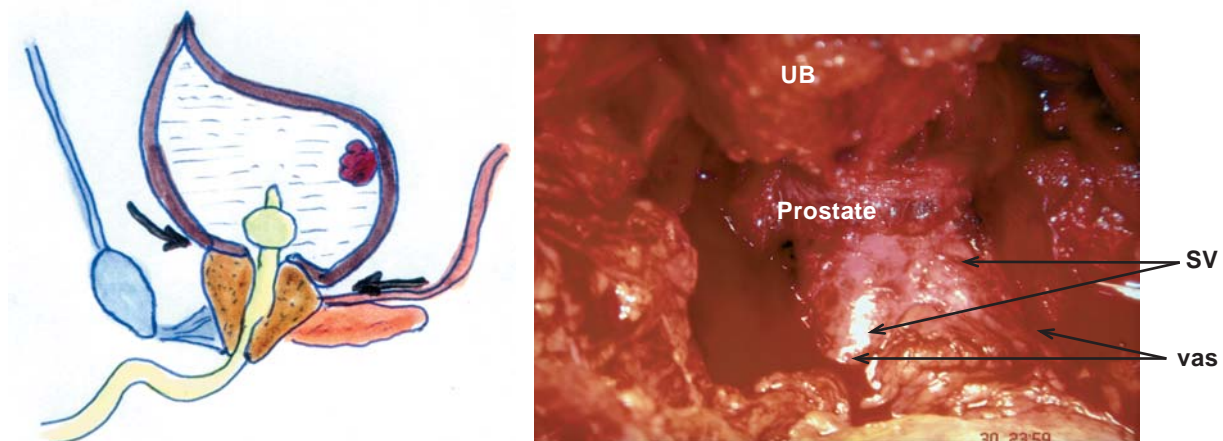


Fig. (1): Identification of the seminal vesicle will identify the proper plane of dissection, the dissection is continued anterior to the seminal vesicle till the base of the prostate.

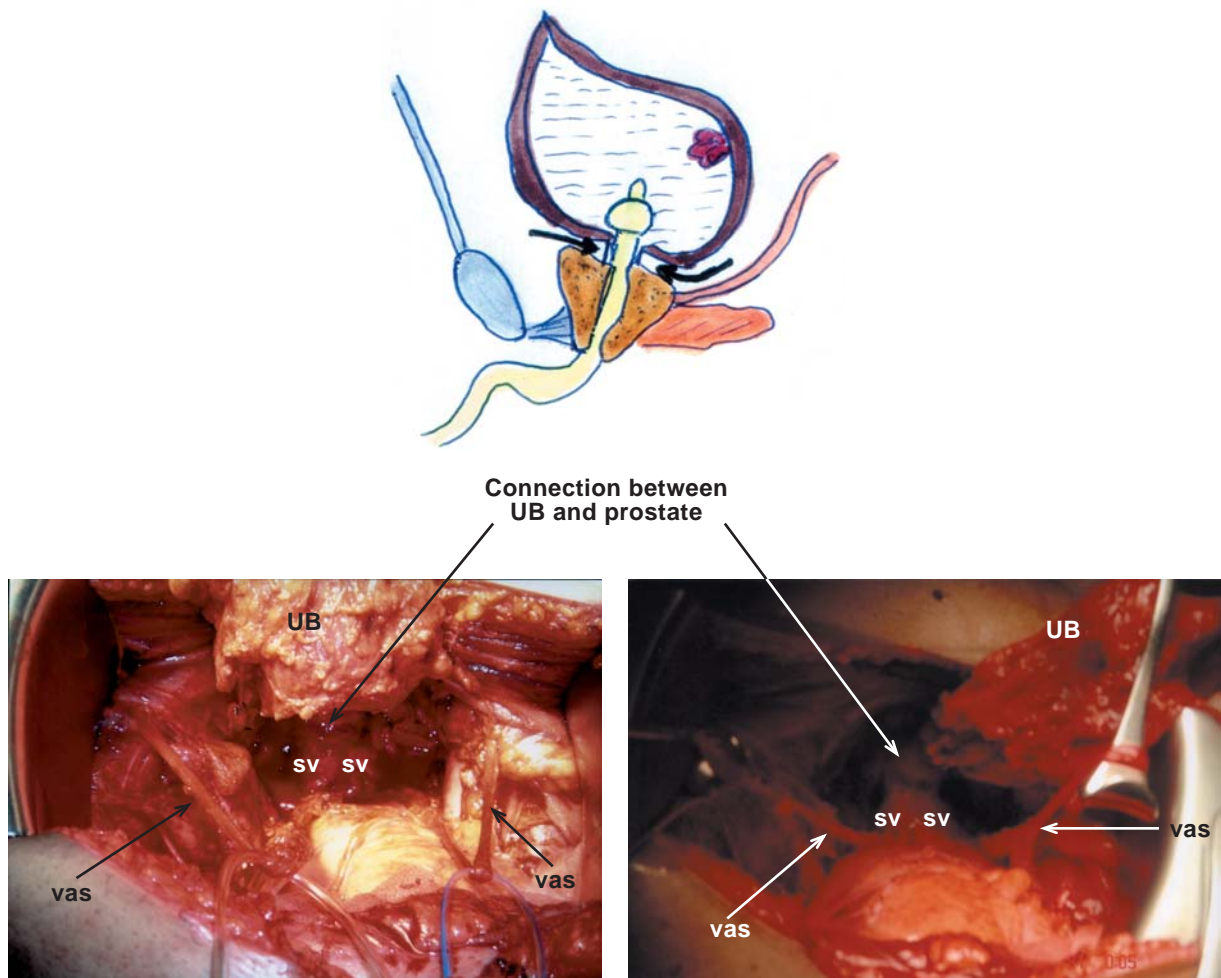


Fig. (2): A plane of dissection can be created between the bladder base and the base of the prostate with sharp dissection anteriorly till the connection between them is the mucosa at the bladder neck over Foley catheter.

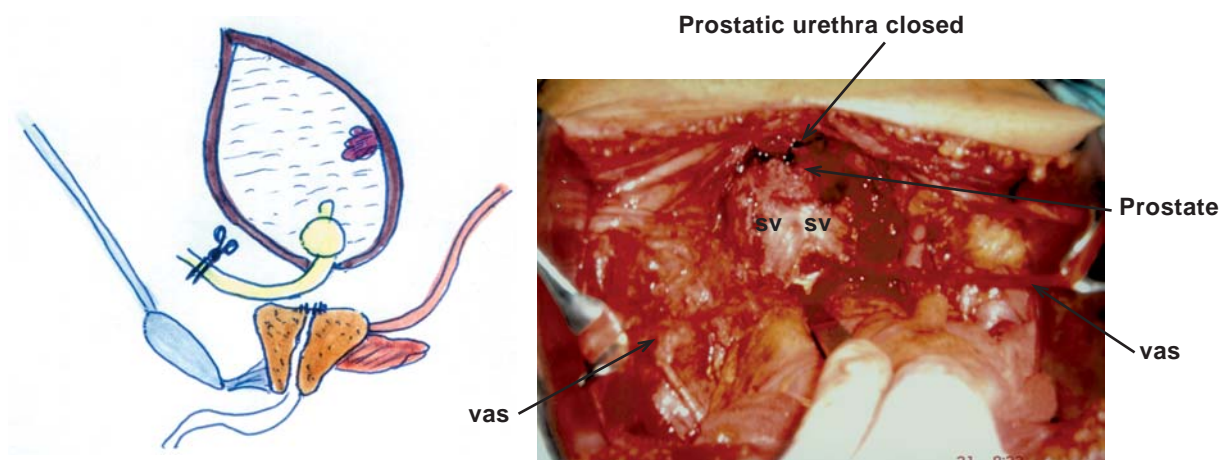


Fig. (3): Incision of the mucosa at the bladder neck around the catheter, the catheter is extracted, clipped by artery clamp, incised distal to the artery clamp to make mild traction on the bladder, then the proximal part of the prostatic urethra is closed by sutures.

RESULTS

Seven patients with a median age of 40 year were included in our study. All patients had organ-confined disease with negative surgical margins according to the frozen section and post operative pathology (pT2bN0M0G2-3). The mean operative time was 2.5 hours. The mean blood loss was 400 ml (range 140-900). The mean hospital stay was 14 days (range 9-20). No perioperative complications occurred. The mean follow up was 20 months (range 6-36). No patients had recurrent disease postoperatively at the last follow-up.

Serological and radiological studies showed normal renal function and appearance in all cases. The erectile function was resumed at one month in three patients, at three months in two patients, and at 11 months in two patients. All reported adequate sexual function with normal erection and satisfactory intercourse.

Antegrade ejaculation was documented in 86% (6/7) of our patients and all had semen analysis of average parameters, while one of them fathered a child.

DISCUSSION

We present a modified technique of radical cystectomy with intent to preserve the ejaculatory function in young patients with localized bladder carcinoma who strongly asked for preservation of the sexual and ejaculatory functions.

Our modification is based on the standard technique of radical cystectomy and the pelvic neuroanatomy to preserve potency and antegrade ejaculation. This will obviate the need for cryopreserved sperms or IVF techniques.

Five out of seven patients resumed their erectile activity very early within the first three months postoperatively. This technique pre-

serves potency because the neurovascular bundles (NVBs) are not at risk of injury, as we do not dissect lateral to the prostate or lateral to the urethra where the NVBs may be injured.

Even, if those patients need orthotopic pouches, the continence rate will still be high because the rhabdoid sphincter mechanism is preserved or less disrupted in our technique, in addition to the positive value of the preservation of the nerve bundles on the continence mechanism. However, after preoperative counselling, all patients asked for a form of diversion other than orthotopic pouches because of the possibility of intermittent catheterization or retrograde ejaculation, as their main concerns were erectile function and fertility and they were against the need for cryopreserved sperms or IVF techniques to father children.

Similar potency and oncological results were obtained by Spitz et al. [5] after radical cystectomy in four men with non urothelial malignancy with preservation of the VD, SV and posterior part of the prostate. Although all patients had normal erectile function postoperatively, only one patient ejaculated antegrade and the remaining three patients ejaculated retrograde. This can be explained by the absent bladder neck continence mechanism after orthotopic diversion to the prostatic urethra.

Other studies of radical cystectomy for urothelial malignancies with preservation of part of the prostate either by simple adenectomy or transurethral resection of the prostate (TURP) showed potency rates ranging from 59% to 100% and fertility rates between 58% and 100%, but most of the cases had retrograde ejaculation. Local recurrence rates ranged from 0% to 18% [2-4,6-8], while distant recurrence was recorded in only one study to be 21% after a mean follow-up of 21 months [8] (Table 1).

Table (1) : Summary of the literature reporting orthotopic neobladder with preservation of part of the prostate

Author	No. pts.	Median age (yrs)	Mean follow-up (ms)	Ejaculation	Potency	Local Re.	Distant Re.
Meinhardt 2003 [2]	24	58	n.r.	58% (a+r)	79	n.r.	n.r.
Thurman 2004 [3]	23	58	18	n.r.	59	n.r.	n.r.
Muto 2004 [4]	63	49	68	100% (a+r)	95	1.6%	n.r.
Spitz 1999 [5]	4	26	25	100% (a+r)	100	n.r.	n.r.
Vallancien 2002 [6]	100	64	38	100% (r)	82	18%	n.r.
Colombo 2001 [7]	27	52	32	80% (r) 10% (a)	100	n.r.	n.r.
Sèbe 2004 [8]	24	61	21	n.r.	88	0%	21%

n.r. : not reported

a : antegrade

r : retrograde

Re : recurrence

The advantage proposed by the forementioned studies by removing part of the prostate (TURP or adenectomy) prior to radical cystectomy is to decrease the risk of concomitant prostate cancer, carcinoma in situ or TCC in the prostatic urethra or prostatic ducts.

First: As regards the occult prostate cancer risk in the cystoprostatectomy specimens, it was reported by Kabalin et al to be 38% but the tumour volume was less than 1.0 cc in 89% of the specimens [10]. To solve this problem and to exclude the possibility of occult prostate cancer, we assess our patients carefully preoperatively by DRE, PSA, TRUS with prostatic biopsies regardless of normal PSA, DRE and TRUS, in addition to a postoperative strict follow up protocol including DRE, PSA \pm TRUS at six month-intervals for early detection of de novo prostate cancer. Furthermore, in the forementioned studies, only the transitional zone (TZ) was removed, thus a tumour in the peripheral zone (PZ) could be missed in addition to the possibility of false positive or false negative results of the frozen section if TURP was done at the time of radical cystectomy.

Second: For urethral carcinoma in situ or TCC of the prostatic ducts, it was reported to be between 12-25% in cystoprostatectomy specimens [11,12] and most of the cancers were detected in the prostatic urethra [13]. If no tumour was found in the prostatic urethra at the time of surgery, the chance of recurrent disease in the urethra is negligible 10 years postoperatively, as reported by Leuret et al. [14]. To solve this problem, we choose patients with solitary tumours away from the bladder neck with negative biopsies from the rest of the bladder mucosa and prostatic urethra in addition to frozen section from the proximal part of the prostatic urethra at the time of surgery.

Furthermore, in the forementioned studies, recurrence could have occurred in the prostatic fossa after TURP or adenectomy due to spillage of tumour tissue in the raw fossa, as reported in the study of Vallancien et al. [6].

Third: The step of adenectomy or TURP prior to cystectomy will add time to the operation itself together with more anaesthesia especially if TURP was done as a separate procedure few days prior to cystectomy. In addition, bleeding may occur during this step.

Fourth: During TURP, damage to the NVBs may occur directly by excessive diathermy coagulation in the fossa or indirectly by extravasated urine particularly if perforation occurs during TURP. Postoperatively, we will be faced by the problem of retrograde ejaculation with the need for expensive IVF techniques to preserve fertility and this will not be accepted by many patients.

Thus, in our technique by preserving the whole prostate, the potency rates and antegrade ejaculation will be more (100% and 86%, respectively) compared to the forementioned studies with comparable oncological results.

Conclusion:

Our technique of nerve sparing radical cystectomy with prostate sparing is safe, effective, easy to perform with satisfactory clinical and functional outcome as regards fertility and erectile functions with cancer control comparable to the standard procedures.

The indication must be restricted to highly selected cases without potential risk of local recurrence or concomitant prostate cancer with proper postoperative surveillance. Further studies with larger population and long term follow-up are recommended to confirm our results.

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