

# RADICAL PROSTATECTOMY WITH PRESERVATION OF URINARY CONTINENCE

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## ABSTRACT

**Purpose:** In an effort to improve postoperative urinary continence after radical retropubic prostatectomy, a new operation to preserve the bladder neck and a significant portion of the prostatic urethra has been developed.

**Materials and Methods:** The prostatic urethra is dissected in continuity with the bladder away from the lumen of the prostate, which allows for a true urethra-to-urethra anastomosis.

**Results:** A total of 24 patients who underwent the new continence sparing radical retropubic prostatectomy was compared retrospectively to 80 who previously underwent a nerve sparing procedure. Total continence was noted immediately in 11 patients, within 9 days in 15 and within 7 weeks in 21 of 24 who underwent the new operation, compared to 1, 5 and 33, respectively, of 80 who underwent the standard operation. Microscopic positive margins were noted in 2 of 24 patients with the new continence sparing operation. Early results of cancer control were good.

**Conclusions:** Early followup of this new technique of radical retropubic prostatectomy suggest that preservation of the continence mechanism at the level of the bladder neck and prostatic urethra results in significantly improved postoperative urinary continence without adversely affecting cancer control.

KEY WORDS: prostatectomy, urinary incontinence, prostatic neoplasms

Incontinence after radical prostatectomy continues to be a problem for patients. The mechanism for postoperative incontinence is not well explained but must involve injury or destruction of the internal sphincter as well as possible denervation of the sphincter mechanism. Continence rates after radical retropubic prostatectomy vary from 94<sup>1</sup> to 80%.<sup>2</sup> However, others report long-term incontinence rates as high as 47%.<sup>3</sup> Some degree of stress incontinence is not uncommon in many patients after radical prostatectomy.

Preservation of the bladder neck at radical prostatectomy has not been associated with an increase in positive surgical margins,<sup>4</sup> and invasion of the bladder neck by clinically localized carcinoma is rare.<sup>5</sup> The prostatic urethra is consistently not invaded by low stage and small volume cancer on pathological observations at our and other institutions. Occasionally, the urethra has been preserved in patients undergoing simple prostatectomy. Thus, it seems appropriate to evaluate the effect of sparing the bladder neck along with the prostatic urethra in patients undergoing radical prostatectomy.

## MATERIALS AND METHODS

This new method of radical prostatectomy was performed successfully on 24 patients with clinically localized carcinoma of the prostate. The results of these procedures were compared to those of 80 patients who underwent standard nerve sparing radical retropubic prostatectomy previously at our institution. The new steps in this procedure are described.

**Surgical technique.** The patient is prepared in the standard fashion for radical retropubic prostatectomy. The kidney rest is elevated beneath the lumbar spine, and the table is reversed flexed for extension of the lower abdomen. Modified pelvic lymph node dissection is performed as described previously, and the operation progresses as described by Eggleston and Walsh.<sup>6</sup> The dorsal vein is controlled with a

No. 1 polyglactin tie and a 1-zero polyglactin suture ligature. Division is accomplished over a right-angle clamp with the cautery at a setting of 70 on the coagulating current.

Once adequate hemostasis is obtained, the urethra is dissected out of the neurovascular sheath distally, and carefully separated from the apex of the prostate using a Kitner instrument for blunt dissection. The urethra is then divided anteriorly adjacent to the apex of the prostate, and the anterior 3 sutures in the distal urethral stump are placed and include some of the previously divided dorsal vein complex. The posterior portion of the urethra and posterior sleeve of Denonvilliers' fascia are divided separately over a right-angle clamp. Nerve sparing techniques are used based on preoperative parameters and intraoperative judgment. At this point, when the prostate can be tilted vertically from the rectum, the new technique varies significantly.

**Posterior dissection of the vasa deferentia and seminal vesicles.** The fascial tissue overlying the seminal vesicles and vasa deferentia is incised gently in the midline. A right-angle clamp is used to divide Denonvilliers' fascia covering the vasa deferentia and seminal vesicles, and to divide the vascular pedicle to the prostate immediately lateral to each seminal vesicle. The vasa deferentia are easily identified, divided and separated from the adjacent seminal vesicle with blunt dissection. Each seminal vesicle is then surrounded with a right-angle clamp, and easily dissected out in this avascular plane between the posterior bladder wall and previous divided fascial covering. This technique frees the vasa deferentia and seminal vesicles, divides the vascular pedicles before any attention is paid to the bladder neck, and allows for excellent hemostasis and adequate mobility needed later in the procedure.

**Fixation of the Foley catheter and prostatic urethra.** A long Babcock clamp is placed around the Foley catheter through the anterior bladder wall, between the bladder neck and Foley balloon (fig. 1). This clamp will assist in identification of the bladder neck and urethra, and allow for proper stabi-

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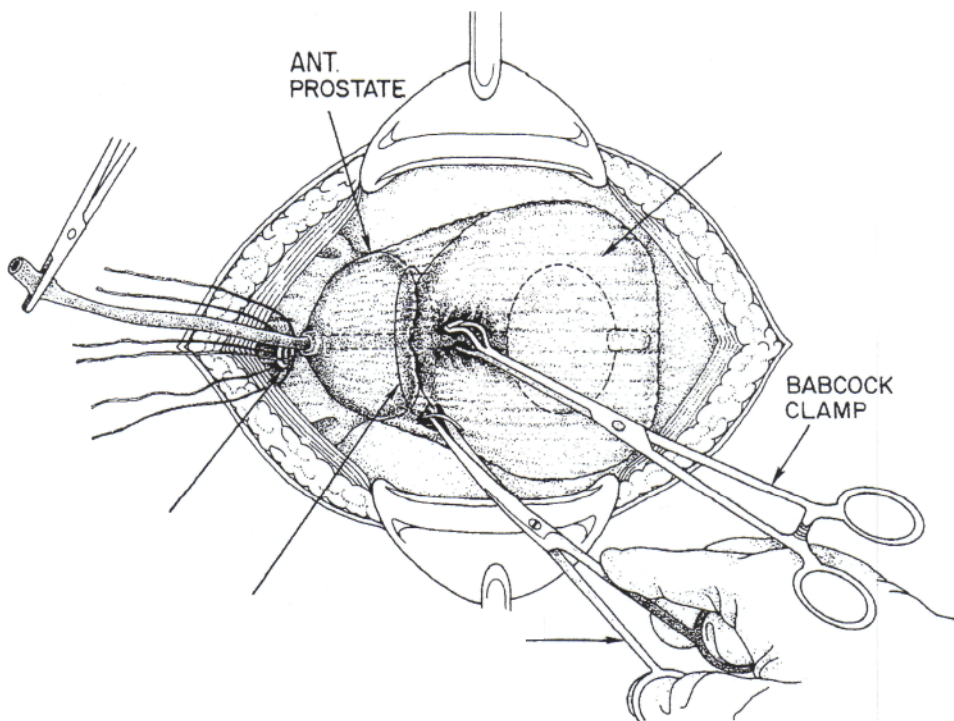


FIG. 1. Fixation of Foley catheter (C.) and urethra with Babcock clamp, and separation of anterior (ANT.) prostate and bladder

lization of the urethra during later delicate dissection. Sharp and blunt dissection is used to isolate the bladder neck adjacent to the prostate, and a plane becomes evident on dissection immediately adjacent to the urethra distal to the bladder neck. This avascular plane between the urethra and lumen of the prostate can be used to dissect carefully between the prostate and bladder circumferentially.

The tissue between the prostate and bladder is fibromuscular, and requires blunt and sharp dissection to free the most proximal prostatic urethra along its complete circum-

ference. The most difficult tissue to divide is that specific area on the posterior surface of the proximal urethra, which requires a delicate technique as well as complete mobilization of the prostate, seminal vesicles and vasa deferentia as described. Proper fixation of the Foley catheter is necessary to identify consistently the true urethra.

*Isolation and division of the prostatic urethra.* Once the urethra is dissected in this fashion it can be teased easily out of the prostatic lumen, which allows for preservation of the prostatic urethra and its associated periurethral musculai

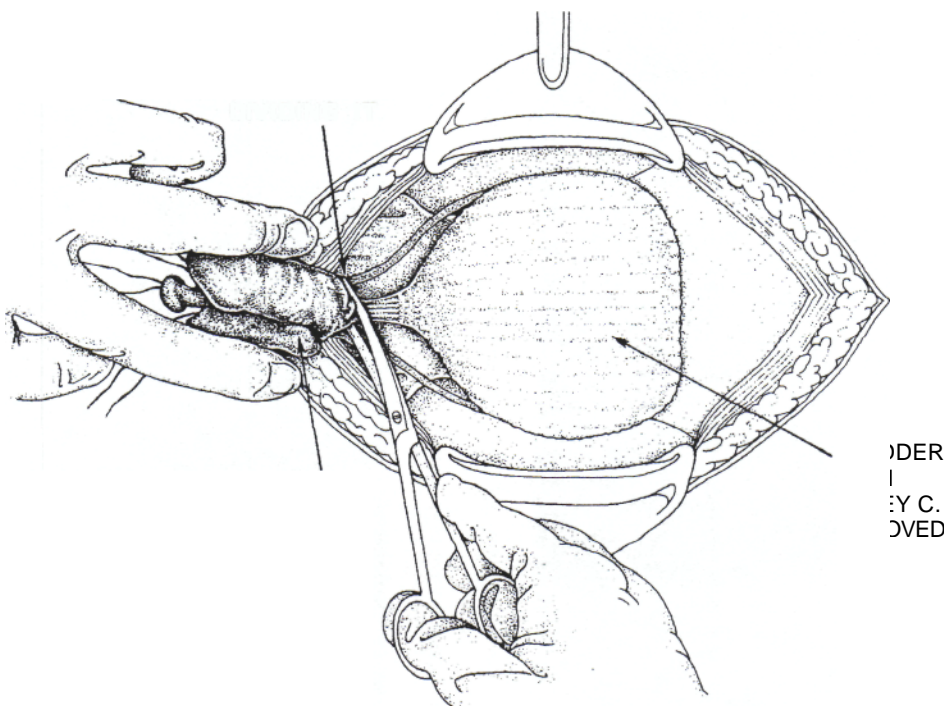


FIG. 2. Division of prostatic urethra after removing Foley catheter (C.). *ANT.*, anterior

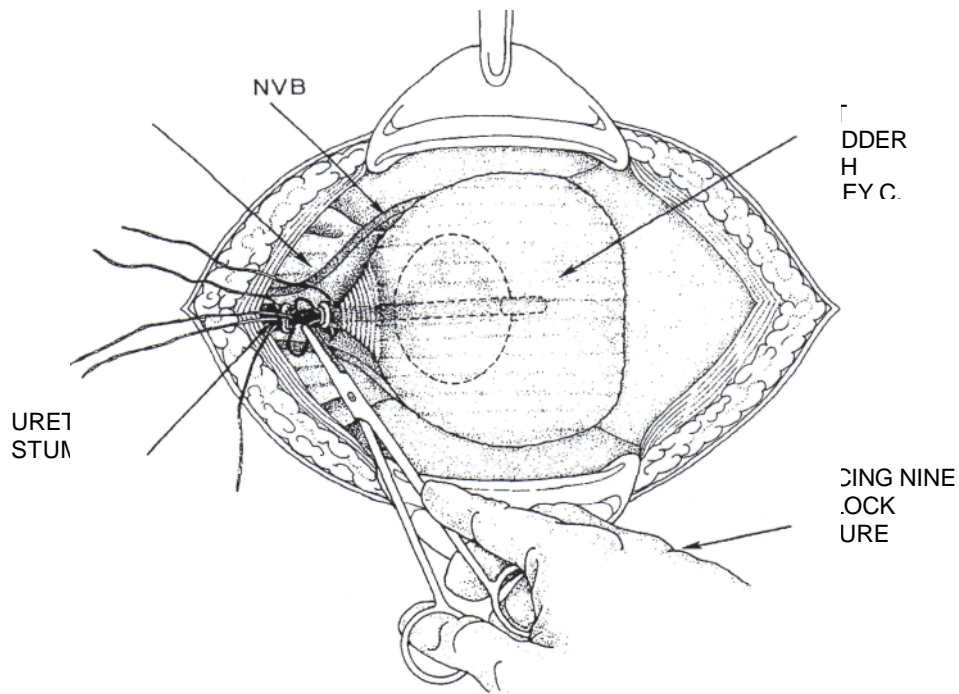


FIG. 3. True urethra-to-urethra anastomosis. *NVB*, neurovascular bundle. *ANT.*, anterior. *C.*, catheter

tissue to the level of the verumontanum (usually 1.5 to 2.5 cm.). The Foley catheter can be removed at this point, and the urethra is easily divided sharply with Metzenbaum scissors (fig. 2). Division is best performed without the Foley catheter in place to ensure a smooth transection without any tearing of the urethra, leaving an intact bladder neck and well defined urethra.

Finally, a true urethra-to-urethra anastomosis is performed using 2-zero polyglactin sutures (fig. 3). The endopelvic muscular tissue is incorporated in the anterior 3 sutures of the urethral stump as previously noted to provide some support for the anastomosis. The bladder is irrigated with a bulb syringe before placing the proximal urethral sutures and usually the bladder neck is competent when applying pressure on the dome of the full bladder. The true lumen of the preserved prostatic urethra is often greater than 40F and no tapering is performed. This anastomosis is currently performed over an 18F, 5 cc balloon Foley catheter. A single pelvic Jackson-Pratt drain is placed and the abdominal wall is closed in a standard fashion.

The specimen is marked with a suture and immediately placed in a formalin-alcohol-acetic acid solution for overnight fixation. The fixed specimen is then inked with separate colors to identify right and left sides, and anterior and posterior surfaces. Serial sections are made at 4 mm. intervals perpendicular to the apical-basal axis. Most are whole mount paraffin embedded specimens but some are divided as necessary to conform to the size of the cassette. Embedding is performed such that each section can be localized within the gland. Routine formalin fixed, paraffin embedded, hematoxylin and eosin stained sections are examined for carcinoma using light microscopy.

RESULTS

The new procedure was successful in 24 patients (average age 67.6 years), with continence noted immediately in 11, within 9 days in 15 and within 7 weeks in 21. Median time to achieve continence was 5.5 days. Only 1 patient required pads 5 months postoperatively. To date no patient has required dilation of the anastomosis or secondary procedures.

Mean hospital stay was 3.4 days, mean estimated blood

loss at operation was 983 cc, average operative time was 175 minutes and mean preoperative prostate specific antigen (PSA) was 6.25 ng./ml. Microscopic positive surgical margins were noted in 2 of 24 patients, and no urethral margins were involved with carcinoma. All patients had intraoperative prostatic urethral biopsies and many had bladder neck biopsies as well. No residual benign or malignant prostatic tissue was found in these specimens. Special attention was paid to the urethral lumen of the prostatic specimens when evaluating the margins. The most extensive specimen showed pathological stage T3a disease but the majority of these patients had relatively low volume, organ confined cancer in the pathological specimens. All followup PSA values were less than 0.1 ng./ml. except in 1 patient who was believed to have clinically localized disease preoperatively but who had poorly differentiated carcinoma in the final surgical specimen with subsequent bony metastases. Many patients reported improved voiding after this procedure compared to preoperatively.

The 24 study patients were compared to 80 similar patients who underwent standard radical retropubic prostatectomy without urethral or bladder neck sparing between 1992 and 1993 (table 1). All procedures were performed by the same surgeon, with reconstruction of the bladder neck and eversion of the mucosa for a mucosa-to-mucosa anastomosis as described previously. Among these 80 patients continence was noted immediately in 1, within 9 days in 5 and within 7 weeks in 32 (median time to achieve continence 63 days, fig. 4).

Statistical comparisons for each group using a nonpara-

TABLE 1. Patient demographics

	Radical Retropubic Prostatectomy	
	Continence Sparing	Standard Nerve Sparing
No. pts.	24	80
Av. age (yrs.)	67.6	64.4
Hospital stay (days)	3.4	4.7
Estimated blood loss (cc)	983	1108
Operative time (mins.)	175	179
Preop. PSA (ng./ml.)	6.25	9.99

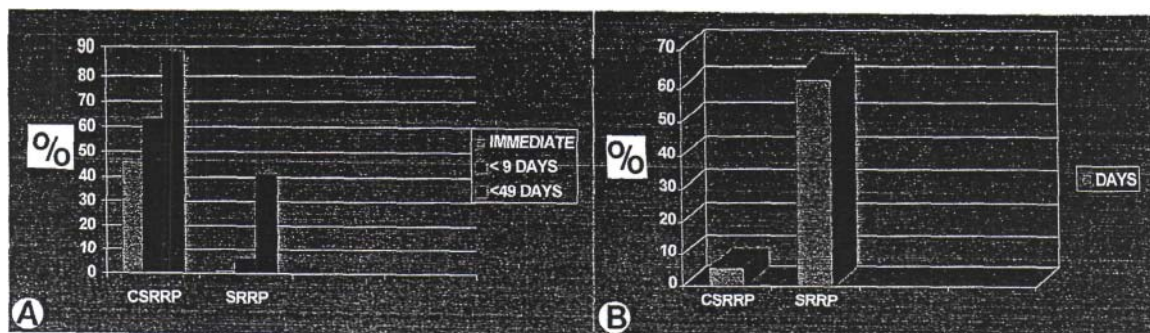


FIG. 4. *A*, times to achieve continence. *B*, median times to achieve continence. *CSRRP*, continence sparing radical retropubic prostatectomy. *SRRP*, standard nerve sparing radical retropubic prostatectomy.

metric 1-way analysis yielded  $p < 0.0001$  for all measures of time to achieve continence between these 2 groups (table 2). Other variables evaluated included average age of 64.4 years, preoperative PSA 9.99 ng./ml., operative time 179 minutes, length of stay 4.7 days and mean estimated blood loss 1,108 ml. These latter variables were not statistically different from those of the 24 study patients.

#### DISCUSSION

A new concept in the surgical approach to prostate cancer was developed. As evident from our results, this early group of patients fortunately had relatively low volume disease clinically and pathologically. None of our patients scheduled to undergo standard radical prostatectomy was excluded from this new approach. Patients were identified with standard early detection methods only. However, until more data are collected the new operation should be considered for patients clinically believed to have localized, organ confined disease only.

Intraoperative judgment should discourage anything but smooth dissection between the prostate and bladder neck, and we encourage intraoperative frozen sections of the prostatic urethra and any suspicious bladder neck tissue. Others have noted residual prostatic tissue at radical prostatectomy in some random biopsies of the preserved bladder neck.<sup>7</sup> However, we did not find residual prostatic tissue in any preserved prostatic urethral biopsy. Many of our patients also underwent biopsies of any fibrotic or suspicious tissue from the preserved bladder neck, and we did not find benign or malignant prostate tissue at either location. The difference in these findings may be due to either our new surgical technique or the relatively low stage of cancer in our patients.

From observing specimens postoperatively, it appears that this new approach may offer a more exacting dissection of the prostate from the base of the bladder. By achieving vascular control of the prostate before dissecting the bladder neck, the surgeon can spend ample time separating the prostate from the bladder to expose the prostatic urethra along its full circumference. More time is necessary for this portion of the procedure using the new approach but this is offset by not having to reconstruct the bladder neck or create a neourethra. The prostatic urethra is delicate and requires

appropriately meticulous dissection. Particular care must be taken when dissecting a median lobe from the posterior urethra. However, even with large median lobes the urethra can be dissected free and preserved intact.

Others have noted the relative sparing pathologically of the bladder neck when attempts have been made to preserve the internal sphincter at this level. Because of difficult anatomical and geometric factors, to our knowledge a reliable method of preserving the prostatic urethra at radical prostatectomy has not been described.

Certain patients are not appropriate candidates for this procedure, including those who underwent previous transurethral resection of the prostate as well as those with tumors of the verumontanum and bladder neck, and bulky tumors at the base of the prostate. However, with this same approach 5 of 7 patients who previously underwent transurethral resection of the prostate reported immediate continence, which probably is due to preservation of the bladder neck and posterior bladder wall near the trigone. Of these patients 6 required no reconstruction of the bladder neck before the anastomosis. None of these 7 patients was included in the study group of 24 patients.

#### CONCLUSIONS

From our early data and experience, this new operation appears to preserve continence without leaving cancer behind to any greater extent than that noted with standard radical retropubic prostatectomy. Only the standard preoperative assessment is necessary to select patients for this new procedure, and intraoperative biopsies of the preserved prostatic urethra are encouraged. We believe that routine biopsies of the bladder neck are not necessary unless there is clinically suspicious tissue. A significant primary benefit of this procedure as described may well be the noticeable decrease in the bladder neck contracture rate.

The results with respect to continence in the earlier group of 80 patients are favorable compared to those reported in the literature. Thus, the results for our 24 patients are significantly improved from those noted after standard radical retropubic prostatectomy. It appears, as expected, that preservation of the internal sphincter at the bladder neck and prostatic urethra will have a significant impact on earlier control of continence. As more data are collected, which patients are best suited for this new approach will become apparent.

TABLE 2. *Measures of continence*

	Radical Retropubic Prostatectomy	
	Continence Sparing	Standard Nerve Sparing
% Continence:		
Immediate	46	1.2
Within 9 days	63	6
Within 49 days	88	41
Median days to achieve continence	5.5	63

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