

POTENCY, CONTINENCE AND COMPLICATIONS IN 3,477 CONSECUTIVE RADICAL RETROPUBIC PROSTATECTOMIES

SHILAJIT D. KUNDU,* KIMBERLY A. ROEHL,* SCOTT E. EGGNER, JO ANN V. ANTENOR,
MISOP HAN AND WILLIAM J. CATALONA†

From the Department of Urology, Feinberg School of Medicine, Chicago, Illinois (SDK, SEE, MH, WJC) and the Departments of Psychiatry (KAR), Neurology (JAVA) and (formerly) Surgery/Urology (WJC), Washington University, School of Medicine, St. Louis, Missouri

ABSTRACT

Purpose: We report results in a series of 3,477 consecutive patients treated with anatomical nerve sparing radical retropubic prostatectomy (RRP) in terms of recovery of erectile function, urinary continence and postoperative complications.

Materials and Methods: From May 1983 through February 2003, 1 surgeon (WJC) performed anatomical RRP using a unilateral or bilateral nerve sparing modification when possible. Urinary continence and recovery of erections were evaluated in men with a minimum followup of 18 months. Excluded from potency analysis were men who were not reliably potent before surgery, those who did not undergo a nerve sparing procedure and those who received postoperative adjuvant radiotherapy or hormonal therapy within 18 months of surgery. Other postoperative complications in this patient population were also evaluated.

Results: Erections sufficient for intercourse occurred in 76% of preoperatively potent men treated with bilateral (1,770) and 53% of men treated with unilateral or partial nerve sparing (64) surgery. Adequate erectile function was more common following bilateral than unilateral nerve sparing surgery in men younger than 70 years old (78% versus 53%, $p = 0.001$) compared with those 70 years old or older (52% versus 56%, $p = 0.6$). Recovery of urinary continence occurred in 93% of all men and was associated with younger age ($p = 0.001$) but not nerve sparing surgery, tumor stage, prostate specific antigen (PSA), Gleason grade or number of prior prostatectomies performed by the surgeon. Postoperative complications occurred in 320 (9%) of patients and were associated with older age ($p < 0.0001$), nonnerve sparing surgery ($p = 0.001$), PSA era ($p < 0.0001$) and surgeon experience. Complications were not significantly correlated with clinical stage, pathological stage, preoperative PSA or Gleason grade. There was no perioperative mortality.

Conclusions: Nerve sparing RRP can be performed with favorable potency and urinary continence. Better results are achieved in younger men. Other complications are reduced with increasing surgeon experience.

KEY WORDS: prostatectomy, urinary incontinence, prostatic neoplasms, penile erection

Prostate cancer is the most commonly diagnosed noncutaneous malignancy in men older than 60 years.¹ Radical prostatectomy offers the best long-term cancer control for clinically localized disease. However, the possible risk of postoperative complications has deterred some men from choosing this treatment.² In 1982 Walsh and Donker introduced the anatomical or nerve sparing radical retropubic prostatectomy (RRP).³ This operation requires that the prostate be removed with controlled hemostasis, allowing visualization of the urethral sphincter and neurovascular bundles of the corpora cavernosa. Erections and urinary continence can be preserved in the majority of patients and the operative mortality rate is less than 0.5%.^{2,4–7}

Nerve sparing RRP has been performed for 2 decades, yet limited long-term potency and continence data are available in large, prospectively followed patient populations. While Walsh et al reported postoperative potency rates of 86% and continence rates of 93%, results from community series, mixed academic and community series and retrospective pa-

tient survey groups have reported a wide range of less favorable outcomes.^{5–11} We previously reported our early results of urinary continence and erectile function¹² and now update them along with other postoperative complications in 3,477 consecutive RRP.

MATERIALS AND METHODS

Patients. One surgeon (WJC) performed anatomical radical retropubic prostatectomy in 3,477 consecutive men between May 1983 and February 2003 with a previously reported technique.¹³ Mean patient age at surgery was 61 ± 7.4 years (range 36 to 80) and 94% (3,268) of the patients were white. Most of the patients (2,875 or 84%) were potent to varying degrees and sought nerve sparing surgery. In these men attempts were made to preserve all or part of 1 or both neurovascular bundles unless there was intraoperative evidence of extracapsular extension of cancer beyond the prostate. Overall 95% (3,303) of the patients underwent at least a partial nerve sparing procedure to the extent that both neurovascular bundles were not widely resected. Clinical characteristics of these men are shown in table 1.

Tumor stage and grade. Clinical staging consisted of digital rectal examination, determination of serum acid phosphatase and/or prostate specific antigen (PSA), and radioisotope

Accepted for publication June 18, 2004.

Supported by a grant from Beckman Coulter, Inc., San Diego, California.

* Equal study contribution.

† Correspondence: Department of Urology, 675 North Saint Clair St., Suite 20-150, Chicago, Illinois 60611 (telephone: 312-695-8146; FAX: 312-695-0283; e-mail: wccatalona@nmff.org).

bone scanning with confirmatory imaging studies or bone biopsies when necessary. Many men also underwent abdominal and pelvic computerized tomography. Clinical and pathological staging was performed as previously described.¹⁴ We classified patients as having either clinically localized disease (stage cT1 or cT2) or clinically advanced disease (stage cT3 or greater). Men whose cancer was confined to the prostate with clear surgical margins were categorized as having pathologically organ confined cancer (stage pT2 R0). Those with histologically documented extra prostatic tumor extension, cancerous surgical margins, seminal vesicle invasion or lymph node metastases were classified as having pathologically advanced disease (stage pT2 R1, pT3a/b/c, or N1 or greater). Before 1992 the Gleason grading system was not routinely used at our institution. After 1992 Gleason grades were routinely assigned as previously described.¹⁵

Radiation or hormonal therapy. Overall 213 patients (6%) elected to undergo adjuvant radiotherapy because of extracapsular tumor extension or positive surgical margins. These patients were excluded from the potency analysis. Following disease recurrence (PSA greater than 0.2 ng/ml) 306 patients (9%) received radiation therapy to the pelvis, including 125 (3.5%) who subsequently also received hormonal therapy. Additionally 121 patients (3%) received hormonal therapy for tumor progression. Men were excluded from the potency analysis if radiation or hormonal therapy was given within 18 months of surgery. Inclusion and exclusion criteria in the potency analysis are shown in the figure.

Followup database. Our followup schedule included PSA measurements at 6-month intervals and a yearly digital rectal examination. Outcomes regarding urinary and sexual function were evaluated with an annual questionnaire on current urinary and sexual function that was completed by patients during a followup visit or at their home, and was assessed by a research assistant. A research assistant contacted patients who did not comply with this schedule. To estimate potency rates we evaluated erectile function with or without the use of phosphodiesterase type 5 inhibitors in patients with at least 18 months of followup for whom erections were sufficient for penetration preoperatively, who underwent nerve sparing surgery and did not receive radiation or hormonal therapy within 18 months of surgery (1,834). We evaluated the return of urinary continence in patients who were followed for a minimum of 18 months (2,737). We considered men continent if they did not require pads or other protection to keep outer garments dry. Mean followup from surgery was 65.0 ± 50.1 months. Ten-year followup was available for 586 (17%) patients and 53 (2%) were lost to followup.

Statistical analysis. The chi-square test was used to compare the erectile status of men by nerve sparing procedure, clinical stage and pathological stage. We used the chi-square test for trend to compare return of erections by age, preoperative PSA, Gleason grade, surgeon experience based on number of prior RRP performed and PSA era (pre-PSA screening era [1983 to 1991] versus PSA screening era [1992 to 2003]). We used Student's t test to compare differences in age by era. A multivariate logistic model was used to analyze return of erections and continence based on significant parameters from the univariate analysis ($p < 0.05$). Patients with postoperative complications were analyzed with the chi-square test.

RESULTS

Patient characteristics. Men in the PSA era were younger (mean age 61 versus 65 years, $p < 0.0001$), more likely to have a PSA less than 10 ng/ml (84% versus 65%, $p < 0.0001$) and more frequently clinical stage T1C (62% versus 6%, $p < 0.0001$, table 2).

Return of erections after radical retropubic prostatectomy. Return of erections was more likely in men who had bilateral versus unilateral nerve sparing surgery (76% versus 53%, $p < 0.0001$, table 3). Younger age was significantly associated with return of erections overall (92% of men age 40 to 49, 85% of men 50 to 59, 70% of men 60 to 69 and 51% of men 70 or older, $p < 0.0001$). Return of potency comparing unilateral and bilateral nerve sparing is shown in table 3. Combining patients who had unilateral or bilateral nerve sparing surgery, return of erections was associated with PSA era (63% in pre-PSA era versus 78% in PSA era, $p = 0.001$) but not associated with clinical stage (66% of men with stage cT1a/b, 78% with stage cT1c and 73% with stage cT2/3, $p = 0.3$) or pathological stage (76% of men with stage pT2 R0, 73% with stage pT2 R1 or pT3a/b and 73% with stage pT3c or N1 tumors, $p = 0.3$). A trend between return of erections and preoperative PSA was not evident (76% for men with PSA less than 2.6 ng/ml, 80% with PSA 2.6 to 4.0, 77% with PSA 4.1 to 9.9 and 72% with PSA 10.0 or more ng/ml, $p = 0.2$). The proportion of men with return of erections also increased with the number of prior prostatectomies performed by the surgeon (68% for the first 1,000 and 78% for RRP 1,001 to 3,000, $p < 0.0001$).

The type of nerve sparing surgery, age, number of prior prostatectomies performed by the surgeon, and era were all associated with return of erections ($p < 0.05$) (in the univariate analysis) and, therefore, were included in the multivariate logistic analysis. Age at surgery by decade of life (odds ratio 1.1, CI 1.0–1.1), bilateral nerve sparing surgery compared to unilateral sparing surgery (OR 2.1, CI 1.2–3.6), and PSA era (OR 1.5, CI 1.1–2.0) were all significant predictors of postoperative potency in the multivariate analysis.

Return of urinary continence. We evaluated return of continence in 2,737 men followed for more than 18 months after radical prostatectomy. Overall 93% of men (2,543 of 2,737) recovered urinary continence. Seven patients (0.3%) underwent placement of an artificial urinary sphincter because of severe stress incontinence. The proportion of those who recovered continence was generally higher in younger than in older men (95% for men age 40 to 49, 96% for men 50 to 59, 93% for men 60 to 69 and 86% of men 70 or older, $p = 0.001$, table 4). Recovery of continence was not significantly associated with the performance of nerve sparing surgery ($p = 0.3$), Gleason grade ($p = 0.05$), surgeon experience ($p = 0.1$), era ($p = 0.05$), PSA ($p = 0.1$) and postoperative radiotherapy ($p = 0.2$). The rates for return of continence stratified by age are shown in table 4 for all patients. In the multivariate analysis

TABLE 1. Characteristics of 3,477 patients undergoing RRP

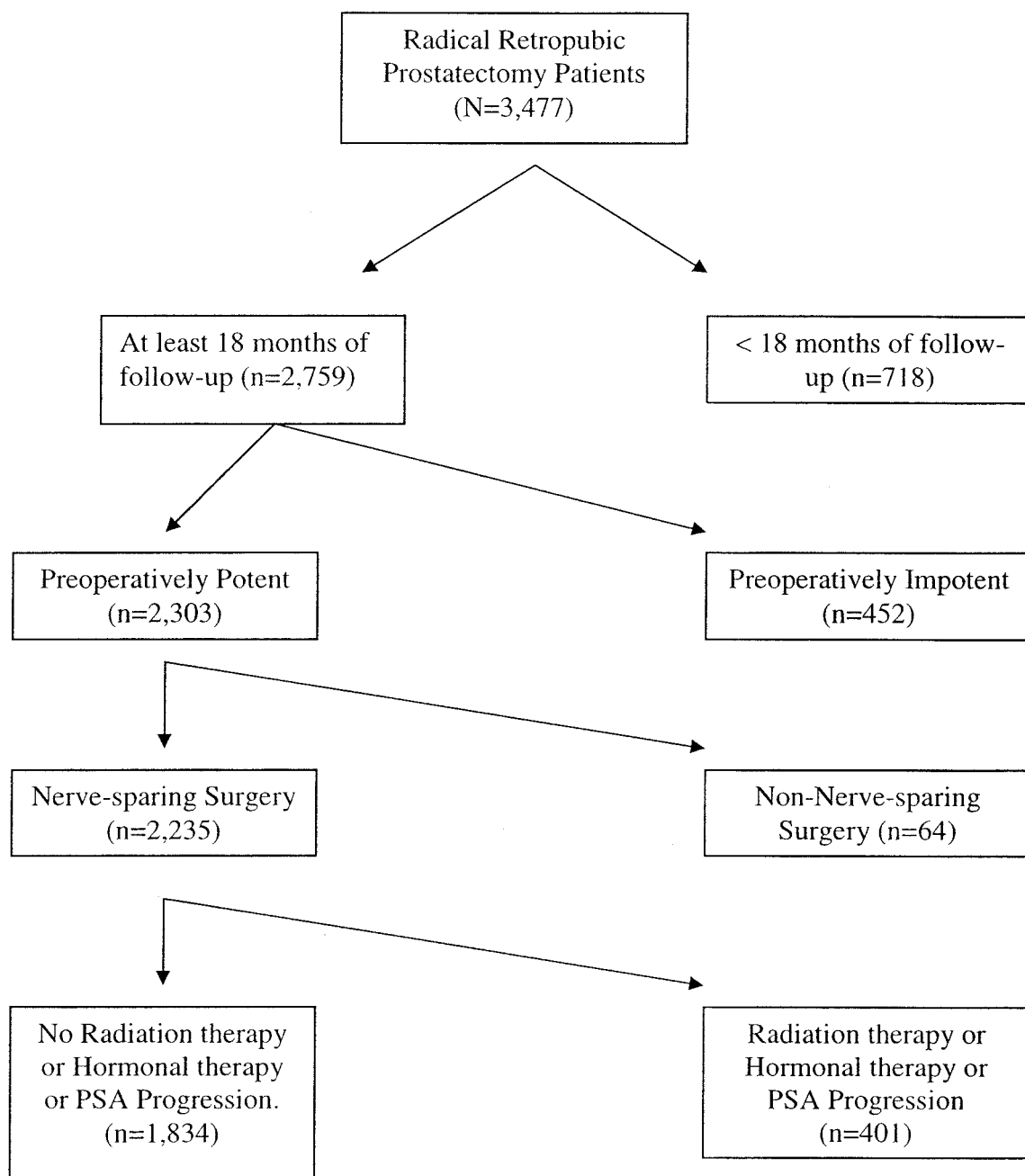
Mean age ± SD (range)	61 ± 7.4 (36–80)
No. race (%):	
White	3,268 (94)
Black	102 (3)
Other	107 (3)
No. preop PSA (%):	
Less than 2.6	222 (7)
2.6–4.0	393 (12)
4.1–9.9	2,054 (62)
10.0 or Greater	633 (19)
No. clinical stage (%):	
cT1a/b	112 (3)
cT1c	1,774 (51)
cT2	1,550 (45)
cT3	35 (1)
No. pathological stage (%):	
T2 R0	2,365 (68)
pT2 R1, pT3a/b	888 (26)
pT3c/N1	202 (6)
No. preop potent (%)	2,875 (84)
No. type surgical procedure (%):	
Bilat nerve sparing	3,146 (91)
Unilat nerve sparing	157 (4)
Nonnerve sparing	165 (5)

younger age (each 10-year interval) was the only variable that predicted for return of continence (OR 1.1, CI 1.0–1.1).

Other postoperative complications. Excluding impotence and urinary incontinence, postoperative complications occurred in 9% of patients (320 of 3,477). The occurrence of any complication was associated with type of surgery (9% for nerve sparing versus 17% for nonnerve sparing, $p = 0.001$), age at surgery (4% for men age 40 to 49, 7% for men 50 to 59, 9% for men 60 to 69 and 14% for men 70 or older, $p < 0.0001$) and PSA era (17% for pre-PSA era versus 7% for PSA era, $p < 0.0001$). Complication rate was not significantly correlated with clinical stage (20% for cT1a/b, 7% for cT1c, 10% for cT2 and 14% for cT3 or greater, $p = 0.3$),

preoperative PSA (8% for PSA less than 10.0 ng/ml versus 11% for PSA 10.0 ng/ml or greater, $p = 0.06$), pathological stage (9% for pT2 R0 versus 9% for pT2 R1/pT3/N1, $p = 0.7$) and Gleason grade ($p = 0.2$).

The specific complications are shown in table 5. Anastomotic stricture was the most common (2.7%), followed in frequency by inguinal hernia (2.5%) and thromboembolism (1.3%). All other complications occurred in fewer than 1% of patients. There was no perioperative mortality. Overall the complication rate decreased significantly by era (16.9% vs 7.4%). Most notably, the anastomotic stricture rate decreased from 8% to 1.5% and thromboembolic complications decreased from 3% to 1%. The rates of other complications were comparable between eras.



(Final Analysis Group)

Inclusion and exclusion criteria in potency analysis

TABLE 2. Characteristics of 3,477 patients undergoing RPP by era

	1983–1991	1992–2003	p Value
Mean age (±SD)	65 (7.0)	61 (7.2)	<0.0001
No. nonwhite race (%)	19 (3)	191 (7)	<0.0001
No. preop PSA less than 10.0 ng/ml (%)	319 (65)	2,350 (84)	<0.0001
No. clinical stage T1c (%)	42 (6)	1,732 (62)	<0.0001
No. pathological stage pT2 R0 (%)	417 (64)	1,948 (70)	0.003
No. surgical Gleason grade 7 or greater (%)	172 (27)	1,082 (39)	<0.0001

TABLE 3. Potency data of 1,834 men after RRP

Age	No. Pts/All Pts (%)		
	All Pts	Bilat Nerve Sparing	Unilat or Partial Nerve Sparing
Younger than 50	119/129 (92)	116/125 (93)	3/4 (75)
50–59	583/688 (85)	574/675 (85)	9/13 (69)
60–69	582/832 (70)	565/794 (71)	17/38 (45)
70 or Older	96/185 (51)	91/176 (52)	5/9 (56)
Totals	1,380/1,834 (75)	1,346/1,770 (76)	34/64 (53)
p Value	<0.001	<0.001	0.2

DISCUSSION

This study represents a followup to our continuing study¹² evaluating a large cohort of patients undergoing anatomical RRP during the last 2 decades with an emphasis on potency, continence and postoperative complications. Our results confirm the favorable earlier results in this series.

Preserving potency after RRP is a primary concern of most men undergoing this operation. Bilateral nerve sparing RRP results in a higher potency rate (76%) than unilateral or partial bilateral nerve sparing surgery (53%). Multivariate analysis demonstrated that a man who underwent bilateral nerve sparing was 2.1 times more likely to regain potency than a man in whom only 1 nerve was preserved. Walsh et al reported an overall potency rate of 86% at 18 months following surgery.⁸ However, the median age of their patients (57 years old) was younger than ours.⁸ Stanford et al reported on a multicenter study of a large community based cohort of patients and found 44%, 41% and 35% of men regained potency after bilateral, unilateral and nonnerve sparing techniques, respectively.¹⁶

Age also had an important role in regaining potency since there was a significant decrease in regaining potency with increasing age. For example a man in his 40s who underwent a bilateral nerve sparing procedure was almost twice as likely to maintain potency than a man in his 70s in the univariate analysis. This trend was also observed in patients who underwent the unilateral nerve sparing procedure. Multivariate analysis also demonstrated a significant increase in potency rates relating to younger age at surgery. This association has been noted by others,^{8,17} confirming that age at

TABLE 4. Percentage of patients with return of continence after radical prostatectomy

Age	No. Postop Continence/Total No. (%)
Younger than 50	142/150 (95)
50–59	843/882 (96)
60–69	1,187/1,272 (93)
70 or Older	371/433 (86)
Totals	2,543/2,737 (93)

Armitage chi-square test p <0.0001.

surgery is clearly a major (and perhaps the most important) factor in regaining potency.

Potency results improved with surgeon experience in our series. Overall recovery of potency occurred in 68% of the first 1,000 prostatectomies and increased to 78% of the most recent 2,000 RRP (p <0.001). This latter number may increase with time since erectile function after RRP does improve in some men beyond 18 months. Improvement of potency in the recent era may be a function of modifications in surgical techniques, surgeon experience, more favorable patient selection by earlier diagnosis through PSA screening and the availability of phosphodiesterase type 5 inhibitors to improve erections.

Preoperative clinical staging did not show a clear association with regaining potency, which is consistent with other published data.¹⁶ In addition, preoperative PSA was not significantly associated with return of erections, suggesting that neither factor is an accurate measure of predicting return of potency.

Urinary continence is another major concern after RRP. While definitions of continence have varied, we defined it as not needing protection to keep outer garments dry. Overall 93% of men followed for more than 18 months recovered urinary continence. As in our previous reports younger age was significantly associated with return of continence since 95% of men in their 40s recovered continence compared to 85% of men in their 70s. Stanford et al reported that 32% of men at 24 months had total urinary control and 40% had occasional leakage.¹⁶ However, 58% of men in their study used no pads and only 8% of men described incontinence as a big problem.¹⁶ Maffezzini et al reported that 89% of their patients were continent with a median followup of 29 months using a bladder neck sparing technique.¹⁸ Walsh et al reported that 93% of patients were dry at 12 and 18 months after surgery using a definition similar to that of the current study.⁸

Recovery of continence was not associated with performance of nerve sparing surgery, Gleason grade, surgeon experience, PSA era, preoperative PSA or postoperative radiation therapy. Most men (95%) in this series underwent at least partial nerve sparing prostatectomy. It is possible that there were not enough patients in the nonnerve sparing group to detect a statistically significant difference between those whose nerves were salvaged and those whose nerves

TABLE 5. Percentage of 3,477 patients with postoperative complications by era

	No. Pts	% (95% CI)	1983–1991 (656 pts) No. (%) [95% CI]	1992–2003 (2,821 pts) No. (%) [95% CI]
Anastomotic stricture	95	2.7 (2.2–3.3)	54 (8.2) [6.2–10.6]	41 (1.5) [1.0–2.0]
Hernia (inguinal, incisional)	88	2.5 (2.0–3.1)	17 (2.6) [1.5–4.1]	71 (2.5) [2.0–3.2]
Thromboembolic	45	1.3 (0.9–1.7)	20 (3.0) [1.9–4.7]	25 (0.9) [0.6–1.3]
Miscellaneous*	44	1.3 (0.9–1.7)	9 (1.4) [0.6–2.6]	35 (1.2) [0.9–1.7]
Infectious	26	0.7 (0.5–1.1)	4 (0.6) [0.2–1.6]	22 (0.8) [0.5–1.2]
Wound	7	0.2 (0.1–0.4)	1 (0.2) [0.0–0.8]	6 (0.2) [0.1–0.5]
Lymphatic	7	0.2 (0.1–0.4)	5 (0.8) [0.2–1.8]	2 (0.1) [0.0–0.3]
Neurological	5	0.1 (0.0–0.3)	0 (0)	5 (0.2) [0.1–0.4]
Myocardial infarction	3	0.1 (0.0–0.3)	1 (0.2) [0.0–0.8]	2 (0.1) [0.0–0.3]
Totals	320	9.1 (8.3–10.2)	111 (17.0) [14.1–20.0]	209 (7.5) [6.5–8.4]

* Includes Peyronie's disease, cholecystitis, catheter complications, hematoma, hemorrhage, hematuria, ulcer, gout and unrelated complications.

were sacrificed. However, we believe the most important surgical factor in maintaining the urinary continence mechanism is a meticulous dissection at the prostatic apex in an operative field with good hemostasis and avoidance of injury to the external urinary sphincter.

Other complications occurred in 9% of men. Overall complications decreased with surgeon experience. Specific complications categorized by era are listed in table 5. Men who underwent nonnerve sparing surgery were twice as likely to suffer a complication as those whose cavernosal nerves were preserved (16% vs 7%). Increasing age and pre-PSA era were also associated with increased complication rates. Anastomotic stricture was the most commonly noted complication occurring in 2.7% of patients overall. While the incidence of most complications has remained low and fairly constant by era, rates of anastomotic strictures and thromboembolism have decreased considerably. In the previous era anastomotic stricture rates as high as 8% were noted when the bladder neck was closed tightly around an 18Fr catheter. By closing the bladder neck to 22 to 24Fr we decreased the incidence of bladder neck contractures in the more recent era. Incisional and inguinal hernias occurred in 2% of patients. Other complications such as infections and clinically significant lymphoceles were rare. Our results are similar to data published in other large series^{19,20} indicating that RRP can be performed by experienced surgeons with minimal morbidity.

Several limitations of our study deserve mention. We did not use validated instruments to assess potency and continence outcomes after surgery and, in many cases, the surgeon was the primary data gatherer. However, Walsh et al reported that the patient interview could yield results similar to those of a validated questionnaire regarding sexual function after radical prostatectomy.⁸ We recognize this is no longer considered the optimal method for evaluating surgical outcomes and all data are now gathered by a research assistant.

CONCLUSIONS

The objective of RRP is to achieve high cancer cure rates while minimizing surgical morbidity. This study represents the largest contemporary series of men undergoing RRP to our knowledge, and shows that RRP can be safely performed with low perioperative morbidity. Potency and continence can be maintained in most patients with careful intraoperative attention to anatomical detail.

REFERENCES

1. Landis, S. H., Murray, T., Bolden, S. and Wingo, P. A.: Cancer statistics, 1999. *CA Cancer J Clin*, **49**: 8, 1999
2. Walsh, P. C., Partin, A. W. and Epstein, J. I.: Cancer control and quality of life following anatomical radical retropubic prostatectomy: results at 10 years. *J Urol*, **152**: 1831, 1994
3. Walsh, P. C. and Donker, P. J.: Impotence following radical prostatectomy: insight into etiology and prevention. *J Urol*, **128**: 492, 1982
4. Steiner, M. S., Morton, R. A. and Walsh, P. C.: Impact of anatomical radical prostatectomy on urinary continence. *J Urol*, **145**: 512, 1991
5. Lerner, S. E., Blute, M. L., Lieber, M. M. and Zincke, H.: Morbidity of contemporary radical retropubic prostatectomy for localized prostate cancer. *Oncology*, **9**: 379, 1995
6. Zincke, H., Oesterling, J. E., Blute, M. L., Bergstralh, E. J., Myers, R. P. and Barrett, D. M.: Long-term (15 years) results after radical prostatectomy for clinically localized (stage T2c or lower) prostate cancer. *J Urol*, **152**: 1850, 1994
7. Eastham, J. A., Kattan, M. W., Rogers, E., Goad, J. R., Ohori, M., Boone, T. B. et al: Risk factors for urinary incontinence after radical prostatectomy. *J Urol*, **156**: 1707, 1996
8. Walsh, P. C., Marschke, P., Ricker, D. and Burnett, A. L.: Patient-reported urinary continence and sexual function after anatomic radical prostatectomy. *Urology*, **55**: 58, 2000
9. Mettlin, C. J., Murphy, G. P., Sylvester, J., McKee, R. F., Morrow, M. and Winchester, D. P.: Results of hospital cancer registry surveys by the American College of Surgeons: outcomes of prostate cancer treatment by radical prostatectomy. *Cancer*, **80**: 1875, 1997
10. Fowler, F. J., Jr., Barry, M. J., Lu-Yao, G., Roman, A., Wasson, J. and Wennberg, J. E.: Patient-reported complications and follow-up treatment after radical prostatectomy. The National Medicare Experience: 1988–1990 (updated June 1993). *Urology*, **42**: 622, 1993
11. Gaylis, F. D., Friedel, W. E. and Armas, O. A.: Radical retropubic prostatectomy outcomes at a community hospital. *J Urol*, **159**: 167, 1998
12. Catalona, W. J., Carvalhal, G. F., Mager, D. E. and Smith, D. S.: Potency, continence and complication rates in 1,870 consecutive radical retropubic prostatectomies. *J Urol*, **162**: 433, 1999
13. McCarthy, J. F. and Catalona, W. J.: Nerve-sparing radical retropubic prostatectomy. In: *Textbook of Operative Urology*. Edited by F. F. Marshall. Philadelphia: W. B. Saunders Co., chapt. 65, pp. 537–544, 1996
14. Catalona, W. J. and Smith, D. S.: 5-year tumor recurrence rates after anatomical radical retropubic prostatectomy for prostate cancer. *J Urol*, **152**: 1837, 1994
15. Catalona, W. J., Stein, A. J. and Fair, W. R.: Grading errors in prostatic needle biopsies: relation to the accuracy of tumor grade in predicting pelvic lymph node metastases. *J Urol*, **127**: 919, 1982
16. Stanford, J. L., Feng, Z., Hamilton, A. S., Gilliland, F. D., Stephenson, R. A., Eley, J. W. et al: Urinary and sexual function after radical prostatectomy for clinically localized prostate cancer: the Prostate Cancer Outcomes Study. *JAMA*, **283**: 354, 2000
17. Litwin, M. S., Melmed, G. Y. and Nakazon, T.: Life after radical prostatectomy: a longitudinal study. *J Urol*, **166**: 587, 2001
18. Maffezzini, M., Seveso, M., Taverna, G., Giusti, G., Benetti, A. and Graziotti, P.: Evaluation of complications and results in a contemporary series of 300 consecutive radical retropubic prostatectomies with the anatomic approach at a single institution. *Urology*, **61**: 982, 2003
19. Lepor, H. and Kaci, L.: Contemporary evaluation of operative parameters and complications related to open radical retropubic prostatectomy. *Urology*, **62**: 702, 2003
20. Lepor, H., Nieder, A. M. and Ferrandino, M. N.: Intraoperative and postoperative complications of radical retropubic prostatectomy in a consecutive series of 1,000 cases. *J Urol*, **166**: 1729, 2001