Retrospective Analysis of Factors Affecting Continence after Robotic Radical Prostatectomy

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ABSTRACT

Objective: Objective: In this study, we aimed to evaluate the factors affecting continence in patients who underwent robot-assisted radical prostatectomy for prostate cancer.

Methods: Between August 2009 and January 2014, data of 385 patients, who were treated with robot-assisted laparoscopic prostatectomy for prostate cancer at our clinic, was retrospectively analyzed.

Results: The continence rate was significantly higher at the 12-month evaluation in patients who preoperatively had an International Index of Erectile Function (IIEF) score of >22 and who were at a low risk according to the D'Amico classification ($p<0.05$). The continence rate was significantly higher at the 3-month evaluation in patients who underwent interfascial, classical intrafascial, and fascia-sparing intrafascial techniques compared with those who underwent the classical extrafascial technique. The continence rate was significantly higher in patients who underwent a nerve-sparing surgery.

Conclusion: We found that for the recovery of early and late continences, the use of classical intrafascial and fascia-sparing intrafascial techniques is important. However, we have determined that being at a low risk according to the D'Amico classification and having a high IIEF score are important for the recovery of late continence.

Keywords: Radical prostatectomy, incontinence, prostate cancer, robot assisted surgery

INTRODUCTION

Radical prostatectomy (RP) is the gold standard option in the treatment of organ-confined prostate cancer and in patients whose life expectancy is more than 10 years (1, 2). Although traditional open surgery has been successfully performed, laparoscopic and robotic surgeons are being increasingly used to reduce morbidity. One of the most important complications after RP is urinary incontinence, and many factors such as surgical technique, patient age, neuroprotective application, and anastomosis technique can play a role in the pathogenesis (1).

The present study aimed to evaluate the factors affecting continence in patients who underwent robot-assisted laparoscopic prostatectomy (RALP) due to prostate cancer.

METHODS

After receiving approval from the ethics committee, data from 385 patients who underwent RALP with the diagnosis of prostate cancer in the Urology Clinic of Bakırköy Dr. Sadi Konuk Training and Research Hospital were retrospectively examined between August 2009 and January 2014. Written informed consent was not received from the patients because of the retrospective design of the study. Patients who did not use any pad or who used a single pad for the purpose of protection for a 24-h period were considered as continent. Patients with at least a 12-month follow-up were included in the study. Patients with bladder dysfunction or preoperative incontinence were not included in the study. In our study, age, body mass index (BMI, kg/m^2), Charlson comorbidity index (CCI), digital rectal examination results, pre-diagnosis prostate-specific antigen (PSA) level, prostate volume, preoperative International Index of Erectile Function (IIEF) score, International Prostate Symptom Score (IPSS), Gleason score, D'Amico risk classification, clinical stage, prostate operation history, surgical technique, lymph node dissection, protection of neurovascular bundles (NVBs), operation time, catheterization duration (in days), perioperative bleeding amount, specimen Gleason score, pathological stage, and continence status on the 1st day and on the 1st, 3rd, 6th, and 12th month after the withdrawal of the catheter were obtained.

Statistical Analysis

The results are shown as mean±standard deviation. Student's t-test was used to compare the data of the two groups (incontinent and continent) that were formed. The chi-square test was used to compare qualitative data. The results are provided with 95% confidence intervals, and $p<0.05$ was accepted to be statistically significant.

RESULTS

The mean age of the patients was 60.9±6.3 years (41–76 years), and the mean BMI was 27.6±2.0 kg/m^2 (23–35 kg/m^2). The mean serum PSA level was 8.4±5.6 ng/mL (1–47 ng/mL), and the mean prostate volume was 41.3±22.0 cm^3 (10–150 cm^3). According to the D'Amico classification, 58.7% of the patients were found to have low risk, 33.8% were found to have moderate risk, and 7.5% were found to have high risk. The T1 clinical stage was detected in 297 patients (77.1%), and the T2 or higher clinical stage was detected in 88 patients (22.9%). A history of prostate surgery was found in 26 patients (6.8%). Detailed preoperative information of the patients is presented in Table 1.

The mean duration of surgery was 202.5±80.6 min, and the mean blood loss was 128.7±77.1 mL. RP was performed in 33 (8.5%) ex-

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trafascial cases, 50 (13.0%) classical interfascial cases, 219 (56.9%) classical intrafascial cases, and 83 (21.6%) fascia-preserving intrafascial cases. Pelvic lymph node dissection was performed in 21 (5.5%) patients. Nerve-sparing surgery was performed for 93.5% of the patients.

The mean duration of urethral catheterization was 9.4±1.4. In the postoperative histopathological examinations, the clinical stage was found to be T2 in 348 (90.3%) patients and T3 in 37 (9.7%) patients. The specimen Gleason score was found to be 6 or lower in 233 (60.5%) patients, 7 in 137 (35.6%) patients, and 8 or higher in 15 (3.9%) patients. The mean follow-up duration was 25.6±14.0 months. The perioperative and postoperative data of the patients are summarized in Table 2.

When the continence rates and data were compared on the 1st day, in the 1st month, and in the 6th month after the withdrawal of the catheter, there was no statistically significant difference between the two groups. There was only a significant difference in the continence values in the 3rd and 12th months.

In the controls performed in the 3rd month, there were no significant differences in the preoperative or postoperative findings of the patients classified as being continent and incontinent. The continence rates of the patients who underwent nerve-sparing surgery and the continence rates in classical interfascial, classical intrafascial, and fascia-preserving intrafascial techniques were significantly higher than those of the patients who underwent the classical extrafascial technique ($p<0.05$).

The 12th month continence rates were significantly higher in patients with a preoperative IIEF score of 22 and above and patients with a low risk according to the D'Amico classification ($p=0.001$).

The continence rates were found to be statistically significantly higher in patients who underwent nerve-sparing surgery and in patients treated with classical intrafascial and fascia-preserving intrafascial techniques ($p<0.05$).

Table 1. Patients' preoperative findings

Mean age		60.9±6.3 (41–76)
BMI (kg/m^2)		27.6±2.0 (23–35)
Charlson comorbidity index (score/patient percentage)	0-1	4.2%
	2	26%
	3 and above	69.8%
Mean PSA level (ng/mL)		8.4±5.6 (1–47)
Prostate volume (cm^3)		41.3±22.0 (10–150)
IPSS (score/patient percentage)	0–7	49.1%
	8–19	46 %
	20–35	4.9%
IIEF (score/patient percentage)	>21	55.8%
	<21	44%
Gleason score (score/patient percentage)	<6	70.1%
	7	25.7%
	>8	4.2%
D'Amico risk classification	Low risk	58.7%
	Moderate risk	33.8%
	High risk	7.5%
Clinical stage(patient percentage/clinical stage)	T1	77.1%
	T2	22.9%

BMI: body mass index; IIEF: International Index of Erectile Function; IPSS: International Prostate Symptom Score

Table 2. Patients' preoperative and postoperative findings

Duration of operation (min)	202.5±80.6
Mean blood loss (mL)	128.7±77.1
Mean duration of urethral catheterization (days)	9.4±1.4
Postoperative pathologic stage (patient percentage/clinical stage)	90.3%/T2
	9.7%/T3
Specimen Gleason score	60.5%/<6
	35.6%/7
	3.9%/ >8

DISCUSSION

The continence rates after RALP are in the range of 90–95% in the literature (3-5). Coelho et al. (6) reported the continence rates after radical retropubic prostatectomy, laparoscopic RP (LRP), and robot-assisted LRP (RALRP) as 79%, 84.8% and 92% respectively.

We think that the differences in the ratios in the literature are due to the fact that the evaluation forms and definitions are not standard.

Novara et al. (7) stated that early onset continence was associated with the preservation of periurethral tissue, age, and CCI.

In our study, no statistically significant difference was found in continent and incontinent patients in the 3rd and 12th months in the evaluation made according to age and CCI scores.

Advanced age and increased BMI have been shown in various studies to be risk factors for postoperative incontinence (8-11).

There was no statistically significant difference in continent and incontinent patients in terms of the age and BMI averages in the 3rd and 12th months in our study.

Mauro et al. (12) found in their multivariate analysis that the duration of catheterization, bladder neck preservation, and preoperative IIEF values were associated with early continence. Wille et al. (13) and Takenaka et al. (14) have identified preoperative erectile function as a marker of post-prostatectomy incontinence. In addition, Takenaka et al. (14) found the continence rate to be 71% in those without preoperative lower urinary tract symptoms and 64% in those with preoperative lower urinary system symptoms.

In our study, the continence rate in the 3rd month in patients with a preoperative IIEF score of 22 and higher was 73.9%, and the continence rate in the 3rd month in patients with a preoperative IIEF score lower than 22 was 66.5%. In the evaluation made on the 12th month, the continence rate in patients with a preoperative IIEF score of 22 and higher was 92.5%, and it was 77.0% in patients with a preoperative IIEF score lower than 22.

There was no statistically significant difference in the evaluation made according to preoperative IIEF score in the 3rd month; however, the continence rate in the 12th month in patients with a preoperative IIEF score 22 and higher was statistically significantly higher than the rate of continence in patients with a preoperative IIEF score lower than 22. In our study, the continence rates in the 3rd and 12th months were 74.1% and 87.3%, in patients with preoperative IPSS 0–7, 67.7% and 85.3%, respectively, in patients with preoperative IPSS 8–19, and 63.1% and 73.6%, respectively, in patients with preoperative IPSS 20 and over. Considering preoperative IPSS values, there was no statistically significant difference in the continence rates in the 3rd and 12th months.

There are opposing opinions in the literature about the relationship between postoperative incontinence and prostate volume. Some authors found no association between prostate volumes and continence rates (8, 15, 16). Meeks et al. (17) emphasized in their study that the median lobe prolonged the operation time but did not affect the continence rates in patients in whom RALP was performed. Konety et al. (18) reported that patients with prostate volume greater than 50 cm^3 had low continence rates.

In our study, although the average prostate volume was smaller in continent patients than in incontinent patients during the 12-month follow-up, there was no statistically significant difference between the two groups.

In most large series, no relationship was found between the stage of the disease and rates of incontinence (9, 19). In some cases, however, the stage of the disease can affect the surgical technique (e.g., nerve-sparing) and the rates of incontinence can be high, which appears to be the result of the surgical technique rather than the disease stage (8, 19-21).

In our study, there was no statistically significant difference in the mean PSA levels of the patients with continence and those with incontinence in the 3rd and 12th months and in the evaluations made according to the preoperative and postoperative Gleason scores. There was no statistically significant difference in the 3rd-month continence rates of the patients with low-, intermediate-, and high-risk classifications according to the D'Amico classification of continent and incontinent patients in the 3rd and 12th months. However, in low-risk patients, the continence rate was found to be 89.8% in the 12th month, and it was statistically significantly higher than that in the other risk groups. In the evaluations made according to the pathological and clinical stages, there was no statistically significant difference in the continence and incontinence rates in the 3rd and 12th months.

Transurethral resection of the prostate has been identified as a risk factor for post-prostatectomy incontinence by Eastham et al. (8) However, Catalona et al. (21) did not confirm this relationship.

In our study, in the 3rd and 12th month evaluation, there was no statistically significant difference in terms of continence in patients who underwent prostate surgery in comparison to those who did not.

Koch et al. (22) found age and the nerve-sparing technique to be associated with the 3rd month continence after RALP. Hollbaugh et al. (23) defined the nerve-sparing RP technique and found the continence rate to be 98%. Burkhard et al. (24) found that the nerve-sparing technique was effective in treating late continence.

In our study, the continence rates in the 3rd month in patients who underwent nerve-sparing surgery and those who did not were 52% and 71.9%, and those in the 12th month were 60% and 87.5%, respectively. The continence rate in patients who underwent nerve-sparing surgery in the 3rd and 12th months was higher than that in in patients who did not undergo nerve-sparing surgery, and a statistically significant difference was detected.

Menon et al. (25) found the continence rates in the 3rd and 12th months to be 90% and 95.2%, respectively, in their 2,625 patients in whom lateral prostatic fascia and endopelvic fascia were preserved during RALP.

Van der Poel et al. (26) showed that preserving the lateral prostatic fascia is the determinant of continence after RALP, and they showed that the preservation of NVBs and fascia is an important factor for maintaining continence.

In our study, we used four different surgical techniques: classical intrafascial, classical interfascial, classical extrafascial, and fascia-preserving intrafascial techniques. In our results, the continence rates in the 3rd and 12th months were 45.5% and 57.5% in the classical extrafascial technique, 64.0% and 74.0% in the classical interfascial technique, 73.9% and 89.5% in the classical intrafascial technique, and 75.9% and 93.9% in the fascia-preserving intrafascial technique, respectively. The continence rates in the 3rd month were significantly higher in the classical interfascial, classical intrafascial, and fascia-preserving intrafascial techniques than in the classical extrafascial technique (Table 3). Continence rates in the 12th month were significantly higher in the classical intrafascial and fascia-preserving intrafascial technique than in the classical interfascial technique and classical extrafascial technique (Table 4).

Braslis et al. (27) reported that bladder neck preservation contributed to early continence and reduced anastomotic strictures. However, they reported in another study that bladder neck preservation did not contribute to late continence, but significantly contributed to early continence (28).

We also believe that bladder neck preservation is important for maintaining continence after prostatectomy. Therefore, in our study, bladder neck preservation was performed in all patients who underwent fascia-preserving surgery.

An anterior and posterior reconstruction technique has been described during RALP, and this reconstructive procedure has been reported to be effective for the early return of continence after RALP (29, 30).

In the study by Steiner (31), a total of 331 consecutive patients were examined, 237 of whom received periurethral retropubic suspension stitches and 94 who did not, and the continence rates were significantly higher at the end of the first 3 months in patients in whom suspension stitches were placed. In the analysis

Table 3. Operative technique and its effect on continence in the 3rd month

Operative technique	Continent	Incontinent	
[a]Classical extrafascial	15 (45.5%)	18 (54.5%)	a vs. b=0.011
			a vs. c=0.001
			a vs. d=0.002
[b]Classical interfascial	32 (64.0%)	18 (36.0%)	b vs. c=0.165
			b vs. d=0.162
[c]Classical intrafascial	162 (73.9%)	57 (26.1%)	c vs. d=0.769
[d]Fascia-preserving	63 (75.9%)	20 (24.1%)	

Table 4. Operative technique and its effect on continence in the 12th month

Operative technique	Continent	Incontinent	
[a]Classical extrafascial	19 (57.5%)	14 (42.5%)	a vs. b=0.152
			a vs. c=0.001
			a vs. d=0.001
[b]Classical interfascial	37 (74.0%)	13(26.0%)	b vs. c=0.009
			b vs. d=0.020
[c]Classical intrafascial	196 (89.5%)	23 (10.5%)	c vs. d=0.273
[d]Fascia-preserving	78 (93.9%)	5 (7.1%)	

of continence results with periurethral suspension, Noguchi et al. (32) reported the continence rates of the 1st, 3rd, and 6th months as 53%, 73%, and 100%, respectively, in the technique in which the puboprostatic ligament was protected.

Menon et al. (33) reported that the laparoscopic method enables apical dissection by reducing damage to the periurethral striated muscles and genitourinary diaphragm.

Because we believed that the preservation of the puboprostatic ligament was one of the important parameters contributing to early continence, we protected the puboprostatic ligament in all patients in whom we performed fascia-preserving intrafascial prostatectomy.

In the literature, very different continence rates after retropubic, perineal, laparoscopic, or RALRP methods may be attributed to the fact that the patient populations, questionnaires used, and surgical techniques applied are not standard.

CONCLUSION

We found that the classic intrafascial and fascia-preserving intrafascial techniques, which lead to the least damage to nerve conduction and fascial support, are important for regaining early and late continence. We have, however, found that it is important that patients have a high preoperative IIEF score and that they are in the low-risk group according to the D'Amico classification in terms of regaining late continence. There is a need for new prospective, randomized studies to support our work.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Bakırkoy Dr. Sadi Konuk Training And Research Hospital.

Informed Consent: Informed consent was not taken from patients due to the retrospective nature of the study.

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