The impact of previous transurethral prostate resection on functional and oncological outcomes of laparoscopic radical prostatectomy

Önceden yapılmış olan transüretral prostat rezeksiyonunun laparoskopik radikal prostatektominin fonksiyonel ve onkolojik sonuçları üzerine etkisi

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Abstract

Objectives: To evaluate the effect of previous transurethral resection of the prostate (TURP) on surgical, functional, and oncological outcomes after laparoscopic radical prostatectomy (LRP).

Material and methods: In 251 consecutive LRP patients, we retrospectively compared intraoperative, functional and oncological outcomes of 20 cases who had previous TURP and found to have an incidental carcinoma (Group 1) with 20 patients who had not (Group 2) by using match-pair analysis. The patients were match-paired for age, preoperative prostate specific antigen (PSA), and prostate volume on transrectal ultrasonography. Perioperative parameters including catheterization time, complications, oncological and functional results were analyzed.

Results: Patients in both groups had similar age, body mass indices, PSA level, and prostate volume. Median operation time was 250 min vs. 210 min (p=0.02), median catheterization time was 9 days vs. 7 dayso, mean tumor volume was 4.1 cc vs. 3.4 cc (p=0.807) for Groups 1 and 2, respectively. Perioperative complications were rectal perforation due to severe adhesion in 1 patient, bladder perforation due to traction in 2 patients, and perirectal fascial tearing due to adhesion in 2 patients in Group 1 and managed during surgery without conversion. Rectal perforation was detected in 1 patient in Group 2 as perioperative complication. Continence rate after 6 months was 80% and 85% (p=0.01) for Group 1 and 2, respectively. Positive surgical margin rates for Group 1 and 2 were 25% and 15%, respectively, with no surgical margin positivity in pT2 disease.

Conclusion: LRP after TURP is a challenging but safe procedure. The time of complete continence is delayed and the rate of possible neurovascular bundle preservation might be reduced in these patients. While preoperative complication rate was higher in patients with previous transurethral resection, there was no difference between groups in postoperative follow-up.

Key words: Laparoscopy; prostate; prostatectomy; transurethral resection of prostate.

Özet

Amaç: Önceden yapılmış olan transüretral prostat rezeksiyonunun (TURP) laparoskopik radikal prostatektomiden (LRP) sonraki cerrahi, fonksiyonel ve onkolojik sonuçlar üzerine etkisini değerlendirmek.

Gereç ve yöntem: Ardışık 251 LRP hastasında, önceden TURP geçirmiş olan ve bir insidental karsinomanın bulunduğu saptanan 20 olgudaki (Grup 1) ve bulunmayan 20 hastadaki (Grup 2) intraoperatif, fonksiyonel ve onkolojik sonuçları retrospektif olarak, eşleştirilmiş (match-pair) analiz kullanarak karşılaştırdık. Hastalar yaş, operasyondan önceki prostat spesifik antijen (PSA) ve transrektal ultrasonografideki prostat hacmi yönünden eşleştirilmiştir. Kateterizasyon süresi, komplikasyonlar, onkolojik ve fonksiyonel sonuçları içeren perioperatif parametreler incelenmiştir.

Bulgular: Her iki gruptaki hastaların yaşları, kitle indeksleri, PSA düzeyi ve prostat hacimleri benzerdi. Grup 1 ve 2 için sırasıyla ortaortanca operasyon süresi 250 dk ve 210 dk (p=0.02), ortanca kateterizasyon süresi 9 gün ve 7 gün (p=0.041), ortalama tümör hacimi 4.1 cc ve 3.4 cc (p=0.807) idi. Perioperatif komplikasyonlar Grup 1'de 1 hastada şiddetli yapışıklığa bağlı rektal perforasyon, 2 hastada traksiyona bağlı mesane perforasyonu ve 2 hastada yapışıklığa bağlı perirektal fasiya yırtılması idi ve bunlar cerrahi sırasında konversiyonsuz tedavi edilmişti. Grup 2'de 1 hastada perioperatif komplikasyon olarak rektal perforasyon görüldü. Altı ay sonraki kontinans oranları Grup 1 ve Grup 2 için sırasıyla %80 ve %85 idi (p=0.01). pT2 hastalıkta cerrahi sınır pozitifliği olmaksızın, pozitif cerrahi sınır oranları Grup 1 ve 2 için sırasıyla %25'e karşılık %15 idi.

Sonuç: TURP'dan sonra LRP zor, ancak güvenli bir işlemdir. Bu hastalarda tam kontinans zamanı gecikmektedir ve olası nörovasküler demet korunması oranı azalmış olabilir. Önceden transüretral rezeksiyon yapılmış olan hastalarda operasyon öncesi komplikasyon oranı daha yüksekse de, operasyon sonrası izlemde gruplar arasında herhangi bir farklılık yoktu.

Anahtar sözcükler: Laparoskopi; prostat; prostatektomi; transüretral prostat rezeksiyonu.

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As surgical treatment of benign prostatic hyperplasia (BPH), transurethral resection of the prostate (TURP) is still the gold standard, in spite of new minimally invasive treatment options such as transurethral prostate laser ablation.[1] An important advantage of TURP is that there is a 3% to 16% rate of incidental carcinoma of the prostate.[1-4] In addition, prostate carcinoma might be detected on screening program despite previous TURP for BPH. In the literature, the results of radical retropubic prostatectomy following previous TURP have been evaluated in several studies,[5-7] although similar data on large series of laparoscopic radical prostatectomy (LRP) are lacking. The impact of previous TURP on perioperative, functional, and oncologic results in LRP patients are therefore not clear.[8,9] The aim of this present study was to determine whether TURP has an impact on the oncological and functional efficacy and morbidity of subsequent LRP.

Material and methods

Beginning November 2004, LRP using the ascending technique was performed on 251 consecutive patients with clinically localized prostate carcinoma. All patients had preoperative physical examinations, serum prostate-specific antigen (PSA) level assessment and transrectal ultrasound (TRUS). In Group 1 patients TURP was performed for BPH. Incidental carcinoma (T1a, T1b) was found in 11 patients and prostate carcinoma was determined on follow-up screening program in the remaining 9 patients. Group 2 patients had TRUS guided biopsies for histological confirmation of the carcinoma. Patient age, preoperative PSA, prostate volume, pathologic stage, Gleason score, surgical margin status, lymph node status, type of nerve-sparing, and type of bladder neck preparation were recorded prospectively in a specific database on Excel. The study population included 220 patients followed longer than 6 months after LRP.

Pathological stage, histological grade, surgical margin status, lymph node metastases, weight of the specimen, and tumor volume were noted by the same pathologist. Pathological stage was recorded according to the sixth UICC TNM classification (TNM 2002) and Stanford protocol.[9] Histological grade was assigned by the Gleason method. The radical prostatectomy specimen was analyzed according to Miles and Davy's method, and final tumor volume in the radical prostatectomy specimens was determined by a circle of equal area called "area equivalent diameter."[10] A positive surgical margin was defined as neoplastic cells reaching contact with the inked surface.

Definition of continence

Patients who stayed totally dry without a safety pad as well as those who were consistently dry but used a safety pad occasionally during normal daily activity (work, exercise, walking) were considered continent. Those who used more than one protective pad per day and/or had urine leak during coughing, sneezing, or during the night were considered as incontinent.

Match-pair definition

Age, preoperative PSA, and prostate volume on TRUS were matched between 20 patients who had previous TURP (Group 1) and without any surgery for the prostate (Group 2).

Surgical technique

The transperitoneal and extraperitoneal approach of the ascending LRP technique has been previously described in detail.[11,12] Pelvic lymph node dissection was performed in patients with PSA >10 ng/ml and/or Gleason score >6 regardless of approach. The urethrovesical anastomosis was performed with interrupted sutures (or due to changes in our technique to a single knot continuous technique). Postoperative analgesia was obtained with pethidine HCl (Liba, İstanbul, Turkey) and metamizole sodium (Novartis Pharm, Germany) on demand on the ward. The intravenous infusion stopped on day 1, a normal diet resumed on day 2. The urethral catheter was removed on day 5-7, depending on the quality of the anastomosis according to cystographic assessment.

Data evaluation

In addition to the data for the matching procedure (Table 1), the following parameters were also evaluated: (i) Intraoperatively: operative time, estimated blood loss, subjective assessment of difficulty of dissection (by the operating surgeon), decrease in hemoglobin (Hb) level between before and after surgery (g/dL) as reduction in percent ([preoperative Hb−postoperative Hb]/preoperative Hb×100), transfusion rates, urethrovesical anastomosis time; (ii) Postoperatively: duration and amount of analgesia, catheterization time, and morbidities and complications according to the Clavien classification[13]; (iii) Oncologic

Table 1. Preoperative demographic findings and clinical stages for both groups [mean±SD (range), n (%) or number of patients]

	Group 1 (n=20)	Group 2 (n=20)	*p*
Age (years)	63.0±6.1 (53-75)	62.1±7.0 (49-75)	0.370
PSA (ng/mL)	11.4±9.6 (0.2-39,2)	11.7±8.9 (0.9-34)	0.911
Gleason score	6.3±1.1 (4-9)	6.1±0.3 (6-7)	0.512
Prostate volume (cc)	34.2±9.6 (20-52)	33.1±9.0 (20-50)	0.742
Clinical T stage			0.811
1b/c	16 (80)	14 (70)	
2	4 (20)	6 (30)	
3a	-	-	
Previous surgery			
Billroth II	1	-	
Laparotomy	1	-	
Cystolithotomy	1	-	
Inguinal herniorrhaphy	1	1	
Appendectomy	1	1	

PSA: prostate specific antigen.

status. Subsequent functional results on incontinence were also included in this analysis for 6 months postoperatively in all patients.

Statistical analysis

Prism software, version 3 was used for matching and the statistical analysis. Normality of the parameters was tested by Kolmogorov-Smirnov and Shapiro-Wilk tests. For comparing matched groups, Student's t test, Mann Whitney-U test, Pearson chi square test, and Fischer exact test were used. A p value of <0.05 was considered statistically significant.

Results

Preoperative data

A total of 20 patients with prior TURP (Group 1) underwent LRP for prostate cancer. All patients underwent TURP because of bladder outlet obstruction. LRP was performed between 9 weeks and 24 months after TURP. Both groups were similar in age, body mass indices, access route, and surgeons' experience. There was also no significant difference in the clinical stages (Table 1).

Perioperative data

Intraoperatively, lymphadenectomy status, and technique of anastomosis in both groups were almost identical (Table 2). Mean operative time was significantly longer in the TURP group (253 min vs. 210 min, p=0.062). This difference reflected the longer anastomosis time despite insignificant difference (39 min vs. 32 min, p=0251) and the significantly higher rate of bladder neck reconstruction needed in Group 1 (11 vs. 4, p=0.031).

While the LRP was described as more difficult in Group 1 than Group 2 (p=0.01), estimated blood loss was similar between the TURP group (450 mL) and the group with no prior prostate surgery (350 mL). The median catheterization time was 9 and 7 days for Group 1 and 2, respectively (p=0.041). Ureteral stents were inserted in one patient preoperatively and in one intraoperatively in Group 1.

The mean amount of narcotic (pethidine), and non-narcotic (metamizole) analgesics and duration of administration were slightly reduced in Group 2; however, this difference was not statistically significant (Table 3).

Complications

The total complication rate was 10% in patients with TURP compared to 5% without previous surgery. One major (Clavien III-IV) complication (rectal injury) and three minor (Clavien I-II) complications occurred in Group 1 (urinary extravasation in 2, ileus in 1). There were 2 major (rectal injury, pulmonary embolism) complications in Group 2. No postoperative surgical intervention or perioperative death occurred. Clinically significant anastomotic strictures occured between 6 months and one year

Table 2. Operative parameters of both groups [mean±SD (median; range), n (%) or number of patients]

	Group 1 (n=20)	Group 2 (n=20)	*p*
Operation time* (min)	253.1±57.9 (250; 150-330)	210.2±62.8 (210; 135-360)	0.064
Anastomosis time (min)	39.3±18.1 (35; 16-90)	32.4±15.2 (30; 16-80)	0.251
EBL (mL)	463.3±150.3 (450; 250-1000)	364.7±167.2 (350; 150-1000)	0.277
Transperitoneal	9	8	0.275
Extraperitoneal	11	12	
Lymphadenectomy (+)	7	8	0.284
Lymphadenectomy (–)	13	12	
No nerve sparing	11	7	0.345
Nerve sparing (UL)	4	5	
Nerve sparing (BL)	5	8	
Simultaneous surgery			
Bilateral JJ catheter	1	-	
Herniorrhaphy	2	1	
Intraoperative complications			
Rectal perforation	1	1	
Bladder perforation	1	-	

EBL: Estimated blood loss; UL: Unilateral; BL: Bilateral. *Operation time is time from making the infraumbilical trocar incision to closing the incisions including the anastomosis time.

after surgery in 5% of Group 1 which were treated with endoscopic incision. In Group 2, any significant anatomic stricture was not detected.

Oncological results

The pathological analysis of the specimens demonstrated a difference in the tumor size in both groups. The mean tumor volume in Group 1 was similar to that in Group 2 (4.1 cc vs. 3.4 cc, p=0.807). Positive surgical margin was found in 5 (25%) and 3 (15%) patients for Group 1 and 2, respectively (p=0.821). In pT2 patients, there was no positive surgical margin for either group. For patients with pT3 disease, 55% (5/9) and 37% (3/8) had positive margins in Group 1 and 2, respectively. No patient died of prostate cancer in the follow-up period (Table 4). Median follow-up periods were 24 months and 22 months (p=0.501); PSA recurrence-free rates were 80% and 86% for Group 1 and 2, respectively.

Continence

Continence rate within 6 months was significantly higher in Group 2 (55% vs. 75%, p=0.01). However, at 6 months following LRP, there was no longer any statistical difference, with complete urinary control of 80% in Group 1 vs. 85% in Group 2 , respectively (Table 3).

Discussion

Prostate cancer screening using PSA blood analysis enables a significant decrease in the frequency of incidentally detected prostate cancer.[14] Furthermore, the increasing use of prostate biopsies has led to fewer cases where prostate cancer is diagnosed from TURP chippings. Theoretically, such tumors should be of low volume and predominantly clinically insignificant. But the results of our histopathologic examinations showed that no specimen in Group 1 had residual tumor. In contrast, 83.6% of the cT1a and cT1b stages revealed a clinically significant tumor (>0.5 cc and/ or Gleason ≥7), with a mean tumor volume of 1.7 cc for cT1a and 2.4 cc for cT1b cases.[15] In addition, 30% of men in Group 1 showed a prostate capsule invasion, and 15% showed invasion of the seminal vesicles in the final pT stage in the present study. In addition, the mean tumor volume (4.1 cc vs. 3.4 cc) and the percentage of clinically relevant tumors were similar in Group 1 and Group 3; thus one should offer both stages (cT1a and cT1b) a further curative therapy.

There are conflicting reports in the literature as to whether a previous TURP worsens the prognosis following radical surgery. Tumor cell seeding may

Table 3. Postoperative parameters of both groups [mean±SD (median; range) or number of patients]

	Group 1 (n=20)	Group 2 (n=20)	*p*
Hospitalization (days)	4.4±1.5 (4; 3-9)	3.9±1.7 (3; 3-10)	0.137
Catheterization time (days)	12.2±7.7 (9; 6-36)	7.6±2.7 (7; 4-16)	0.041
Hemoglobin reduction (%)	20.8±10.3 (21.5; 1.8-35.0)	15.9±5.5 (14.5; 8.2-25.8)	0.091
Total narcotic analgesic (mg)	53.3±46.5 (50; 0-150)	72.6±28.6 (80; 30-100)	0.231
Postoperative continence			0.325
Full continence	16	17	
1 pad/day	3	3	
2 pad/day	1*	-	
Period for incontinence evaluation (month)	20.6±10.9 (20; 3-36)	22.1±9.8 (22; 5-36)	0.452

*This patient was at the 3rd postoperative month.

Table 4. Oncologic status of the patients in both groups [mean±SD (median; range), n (%) or number of patients]

	Group 1 (n=20)	Group 2 (n=20)	*p*
Specimen volume (cc)	39.7±14.9 (40; 13-63)	44.8±15.8 (43; 24-78)	0.257
Tumor volume (cc)	4.1±3.5 (2.5; 0.2-10.7)	3.4±3.3 (2.4; 0.6-12.3)	0.807
Gleason score	6.7±1.1 (6; 5-9)	6.4±0.7 (6; 5-8)	0.567
pT Stage			0.478
2a	4	3	
2b	4	5	
2c		3	4
3a	6	5	
3b	3	3	
Positive surgical margin			
Overall	5 (25)	3 (15)	0.721
in pT2	-	-	
in pT3	5	3	
Location			
Apex	1	1	
Dorsolateral	2	1	
Base	2	-	
Vesicula seminalis	-	1	
Follow-up (months)	22.5±11.9 (24; 6-39)	20.0±8.0 (22; 6-36)	0.501

occur during the TURP.[16,17] We could not find a significant difference when comparing the rate of positive margins (overall 25% vs. 15%) for pT2 tumors or pT3 tumors with or without previous surgery. Similarly, Katz et al.[8] reported comparable margin positivity after LRP between patients with and without previous TURP (cT1a/b and cT1c/T2 together). After a mean follow-up of 22 months and 20 months, the PSA-free survival rates (86% vs. 80%, p=0.403) were similar in Group 1 and Group 2, respectively. Local recurrence rate was identical in both groups. This is consistent with the findings of Paul et al.[18] who compared 52 patients with or without previous TURP after retropubic radical prostatectomy and did not find any significant difference in biochemical or local recurrence rate.

In various studies reporting on open procedure or LRP following TURP, the procedure of LRP was described as more difficult. Perforation of the prostatic capsule during TURP with extravasation of blood and irrigation fluid might be reasons for periprostatic fibrosis and distortion of surgical planes. In our study, the dissection was described as more difficult in the TURP group, which is also reflected in the longer operation time (250 min vs. 210 min). In particular, the identification of the anterior bladder neck remains a difficult step after TURP, because of fibrosis and a distorted position of the ureteral orifices. Ureteral stents were inserted preoperatively to identify the orifices in our first case in the TURP group. Katz et al.[8] recommended ureteral catheterization to all patients with a previous history of TURP before LRP. According to our ascending technique, this is not mandatory. The dissection of the bladder neck is carried out after division of the urethra and mobilizing the prostate posteriorly. This procedure enables optimal exposure by lifting apex and the bladder neck up. However, in cases with a short distance between orifices and the dissection line, bladder neck reconstruction may be required more frequently. This maneuver was carried out in a tennis racket fashion in 11 patients in Group 1 and 4 patients in Group 2 (p=0.031). This procedure increases the distance between orifices and the area of anastomosis and decreases the tension on the posterior anastomotic sutures. The median catheterization time was (7 days and 9 days) similar in the two groups. We could not find a higher rate of anastomotic strictures in the former group. This is higher in previously resected prostates in some series, although whether this is related to the higher rate of bladder neck reconstruction or to previous TURP (as discussed in the literature) remains unclear.[19,20]

Colombo et al.[7] reporting 109 retropubic radical prostatectomies following TURP, found a slight increase in early and late complication rates compared to the control group. This is inconsistent with findings in the present study; we found no statistically significant differences between groups on any measures of perioperative morbidity (estimated blood loss, transfusion rate, and analgesic treatment).

The overall complication rate was 10% in Group 1 and 5% for Group 2. According to the Clavien classification,[13] we could not determine significant difference in the grade of complications between both groups. It is likely that the laparoscopic technique enables a finer dissection of the gland in a bloodless field, even after previous TURP.

Because of clinical stage, neurovascular bundle preservation was considered in 75% (n=15) of Group 1 patients, but could only be performed in 6 because of difficult preparation during surgery and suspicion of capsular invasion. For this reason, previous TURP influence the functional outcome of patients after LRP, especially taking into account that the rate of nerve sparing in all 220 patients was 55%. Group 2 was, of course, a negative selected population, but we demonstrated that if nerve sparing was possible after previous TURP, the success rate of potency was similar to the control group.

The continence rate at 3 months was significantly lower in Group 1 than Group 2 (55% vs. 75%, p=0.01). The compromised arterial blood flow after TURP or temporary functional changes as an effect of bladder neck reconstruction are possible explanations. Whether this adverse impact could be reduced by extending the time between TURP and radical prostatectomy beyond 4 months, as discussed in the literature, is still unclear.[19] Despite the continence rates equalizing between both groups after 6 months, patients should be informed about the potential risk of a delayed recovery of continence.

Because of the high rate of significant tumors found in the TURP group, this population should be offered curative treatment. LRP after TURP is a challenging but safe procedure. The time of complete continence is delayed and the rate of possible neurovascular bundle preservation might be reduced in patients who had LRP after TURP.

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