Open radical prostatectomy after transurethral resection: perioperative, functional, oncologic outcomes

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Introduction: To demonstrate any differences in the perioperative, functional and oncologic outcomes after radical retropubic prostatectomy (RRP) among those patients having previously performed transurethral resection of prostate (TURP) and those not.

Materials and methods: A total of 35 patients were diagnosed with prostate cancer (T1a and T1b) after TURP, underwent RRP and completed a 1 year follow up (group A). They were matched with a cohort of another 35 men (group B) in terms of age, body mass index (BMI), prostatic specific antigen (PSA), Gleason score, prostate volume (before surgery), pathological stage and neurovascular bundle-sparing technique. That was a retrospective study completed between September 2011 and March 2014.

Introduction

Prostate cancer is the most common non-skin malignancy diagnosed among elder males in Europe and nowadays is a major global health problem.¹ Established risk factors include increasing age, ethnic origin and heredity and clinical suspicion of the disease is usually based

Results: Not a significant difference was demonstrated among the two groups of patients concerning the functional and oncologic results. On the other hand, previous prostate surgery made the operation procedure more demanding. Besides, operative time and blood loss (though not translated in transfusion rates) were higher among patients in group A. Besides, catheter removal in group A patients was performed later than their counterparts of group B. **Conclusions:** RRP after TURP is a relatively safe procedure and in the hands of experienced surgeons, a previously performed TURP, does not seem to compromise oncologic outcomes of the operation. Continence is preserved, though erectile function seems to be compromised compared with patients undergoing RRP without prior TURP. Moreover, defining the prostate and bladder neck margins can be challenging and the surgeon has to be aware of the difficulties that might confront.

Key Words: prostate cancer, radical prostatectomy, transurethral resection of prostate, erectile function, urinary continence, oncologic results

on elevated prostate specific antigen (PSA) levels or positive digital rectal examination.² When prostate cancer is clinically suspected, definite diagnosis should be based on the results of prostate biopsy. Moreover, prostate cancer is also diagnosed among patients with no clinical suspicion and who underwent transurethral resection of the prostate (TURP) as treatment for benign prostate hyperplasia, although this procedure is not recommended as a tool for cancer detection.³ Such tumors that are clinically unapparent, not palpable or visible by imaging incidentally detected after TURP are classified as T1a or T1b tumors according to the 2009 TNM classification for staging of prostate cancer.⁴

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Open radical retropubic prostatectomy (RRP) is considered as the gold standard for localized Prostate cancer treatment offering both favorable oncologic results combined with low complication rates, continence and sexual function preservation in high volume centers performing this operation.⁵ Although RRP is considered an oncologically safe procedure it has been reported that when it is performed post previous TURP the operation can be technically challenging with increased difficulty levels which may potentially affect both oncologic and functional results.⁶

The aim of this study is to evaluate perioperative, functional and oncologic outcomes of RRP as treatment for localized prostate cancer among patients who had previously undergone TURP as treatment for lower urinary tract symptoms (LUTS) attributed to prostatic hyperplasia.

Materials and methods

A total of 346 consecutive patients underwent RRP in our department between September 2011 and March 2014. In all, 38 patients underwent RRP after having initially been diagnosed with prostate cancer stage pT1a or pT1b after previous TURP and 35 of them completed a 1 year follow up and thus were enrolled in the study (group A). Group B consisted of 35 patients who underwent RRP without any prior surgical intervention to the prostate. All RRPs were performed by two high-volume surgeons who used the same technique, while most TURPs were performed by three surgeons. Patients of group A and B were matched in terms of age, body mass index (BMI), PSA, prostate volume (as both had been evaluated prior to TURP), Gleason score, clinical stage and neurovascular bundle-sparing technique.

Group A patients had been offered an adenoma resection of a mean weight of 24.8 grams. The whole cohort did not undergo any further biopsy in peripheral zone since this would not influence decision-making. Individuals of both groups were evaluated preoperatively by bone scan and abdominal MRI. None of them revealed any metastatic focus.

Extended lymph node dissection was performed in all high risk and intermediate risk patients. In group A, RRP was performed in a mean time of 3.6 months after TURP. In terms of surgical technique, patients of Group A, due to the extended fibrosis of the periprostatic tissues, a wide opening of the bladder neck was performed followed by reconstruction.

TABLE 1. Patient demographics and preoperative characteristics				
	TURP group mean (SD)	Non-TURP group mean (SD)	p value	
Age (years)	63.1 (3.6)	62.1 (4.0)	0.275*	
BMI (kg/m ²)	26.9 (3.6)	26.4 (3.8)	0.573*	
Prostate size (cm ³)	44.3 (12.4)	43.5 (11.9)	0.783*	
PSA ng/mL	3.4 (1.1)	3.5 (1.0)	0.691*	
Gleason score, n (%)			> 0.999**	
≤ 6	21 (60.0)	22 (62.8)		
7	12 (34.3)	12 (34.3)		
>7	2 (5.7)	1 (2.9)		
Clinical stage, n (%)				
T1a	8 (22.9)			
T1b	27 (77.1)			
Erectile function				
(23 patients with				
nerve-sparing)				
No	0	0		
Yes	23	23		
IIEF-5, mean (SD)	22.2 (2.4)	21.6 (2.2)	0.81*	

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*Student's t-test; **Fisher's exact test

TURP = transurethral resection of prostate; BMI = body mass index; PSA = prostate specific antigen; IIEF = International Index of Erectile Function

	TURP group mean (SD)	Non-TURP group mean (SD)	p value
Operative time (min)	124 (20.6)	103.1 (13.0)	< 0.001*
EBL (mL)	312.9 (115.9)	258.4 (108.0)	0.046*
Transfusion, n (%)			> 0.999**
No	31 (88.6)	32 (91.4)	
Yes	4 (11.4)	3 (8.6)	
Nerve sparing, n (%)			0.826‡
No	12 (34.3)	12 (34.3)	
Unilateral	7 (20)	9 (25.7)	
Bilateral	16 (45.7)	14 (40.0)	
Hospital stay(days) median (IQR)	6 (6-6)	6 (6-7)	0.373=
Duration of catheter	14 (14-14)	10 (10-11)	< 0.001=
(days), median (IQR)			·
Perioperative complications, n (%)			> 0.999‡
No	30 (85.7)	30 (85.7)	·
Yes	5 (14.3)	5 (14.3)	
Perioperative complications, n (%)			> 0.999**
Fever	2 (5.7)	3 (8.6)	> 0.999**
Strictures	3 (8.6)	2 (5.7)	

TABLE 2.	Perioperative	characteristics	and	complications
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*Student's t-test; **Fisher's exact test; ‡chi-square test; ‡ Mann-Whitney test TURP = transurethral resection of prostate; EBL = estimated blood loss

A nerve-sparing approach was offered in all patients with Gleason score ≤ 7 and PSA levels < 10 ng/mL.

Results

Patients in both groups completed a 1 year follow up with PSA evaluation at 3, 6 and 12 months postoperatively. The erectile function status was rated according to the International Index of Erectile Function (IIEF) questionnaire and the continence was evaluated from the patients' view just after the catheter removal and at 6 and 12 months after surgery. PSA levels higher than 0.2 mg/mL in two consecutive measurements were defined as biochemical relapse.

Regarding statistical analysis, quantitative variables are expressed as mean values (SD) or as median values (interquartile range). Qualitative variables are expressed as absolute and relative frequencies. For the comparisons of proportions chi-square and Fisher's exact tests were used. Student's t-tests were computed for the comparison of mean values when the distribution was normal and Mann-Whitney test for the comparison of median values when the distribution was not normal. All p values reported are two-tailed. Statistical significance was set at 0.05 and analyses were conducted using SPSS statistical software (version 19.0). The total patient sample consisted of 70 patients (35 in the TURP group A and 35 in the non-TURP group B) with a mean age of 62.7 years (SD = 3.8 years). Demographics and preoperative patients' characteristics are presented in Table 1. The two study groups were similar in terms of age, BMI, PSA, prostate size, Gleason score and pathological stage. No difference was noted in terms of performing nerve sparing approach between the two groups, either unilaterally or bilaterally.

Regarding perioperative results, mean operative time and estimated blood loss were significantly lower in group B. Moreover, mean duration of catheterization was also lower in group B. The proportion of transfusion and the duration of hospital stay were similar in both groups. No difference was recorded in postoperative complications with 5 patients presenting fever and/or urethral stricture in each group, Table 2. Regarding the latter, 3 were treated endoscopically and 2 were observed without any manipulation.

In terms of oncologic results, no statistically significant difference was observed in postoperative Gleason score or positive surgical margins between the two groups, Table 3. Open radical prostatectomy after transurethral resection: perioperative, functional, oncologic outcomes

IABLE 3. Pathological characteristics and functional results				
	TURP group n (%)	Non-TURP group n (%))	p value	
pT stage			> 0.999**	
pT2	23 (65.7)	24 (68.6)		
pT3 ^a	7 (20.0)	7 (20.0)		
рТ23 ^ь	5 (14.3)	4 (11.4)		
Postoperative Gleason score			0.216**	
≤ 6	17 (48.6)	10 (28.6)		
7	16 (45.7)	20 (57.1)		
8-10	2 (5.7)	5 (14.3)		
Surgical margin			0.759‡	
Negative	28 (80)	29 (82.9)	·	
Positive	7 (20)	6 (17.1)		
Complete continence (baseline)			0.068‡	
No	14 (40)	7 (20)		
Yes	21 (60)	28 (80)		
Complete continence (6 months)			0.495±	
No	6 (17.1)	4 (11.4)	·	
Yes	29 (82.9)	31 (88.6)		
Complete continence (12 months)			> 0.999**	
No	2 (5.7)	2 (5.7)		
Yes	33 (94.3)	33 (94.3)		
Erectile function ¹			0.552‡	
No	11 (47.8)	9 (39.1)	·	
Yes	12 (52.2)	14 (60.9)		
Erectile function ²			> 0.999**	
No	4 (57.1)	5 (55.6)		
Yes	3 (42.9)	4 (44.4)		
Erectile function ³			0.389‡	
No	7 (43.8)	4 (28.6)	·	
Yes	9 (56.3)	10 (71.4)		
IIEF-5, mean (SD)	15.8 (2.5)	18.2 (2.8)	0.004*	

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*Student's t-test; **Fisher's exact test; ‡chi-square test ¹regarding patients with unilateral or bilateral nerve sparing; ²regarding patients with unilateral nerve sparing; ³regarding patients with bilateral nerve sparing TURP = transurethral resection of prostate; IIEF = International Index of Erectile Function

No difference in continence rates was noted at baseline evaluation after surgery or at 6 and 12 months postoperatively (we considered continent patients who were totally dry or used a daily safety pad). Erectile function was evaluated by "yes" or "no" as erections sufficient or not for penetration with or without phosphodiesterase-5 inhibitors. This information was elicited by an added direct question about intercourse capability. The result was similar in the two study groups, postoperatively. However, higher values of IIEF-5 score were recorded in group B, Table 3.

Discussion

The aim of this retrospective matched pair analysis was to demonstrate the perioperative, functional and oncologic results of RRP performed in patients with previous TURP surgery in our department.

Incidental prostate cancer can be diagnosed in about 10% of patients who undergo surgery as treatment for bladder outlet obstruction even though an appropriate preoperative evaluation with PSA and DRE has been conducted.7 Radical prostatectomy is nowadays considered the method of choice in the treatment of localized prostate cancer and should be offered as a viable treatment option in patients with incidental prostate cancer diagnosed after surgery for LUTS.⁸ In the past, several concerns regarding RRP after TURP were reported due to the effects of TURP in the prostate anatomy which may make RRP a more challenging operation with sinister impact in perioperative, functional and oncologic results. These anatomic alterations after TURP include a thickened bladder wall due to bladder outlet obstruction, ureteric orifices located more proximally to bladder neck, periprostatic fibrous scarring and fibrosis surrounding the urethra, as well as a wider bladder neck.^{9,10}

The results of this retrospective study demonstrated increased operative time, blood loss and duration of catheterization in patients treated with RRP for localized after previous TURP (group A) in a statistically significant way. However, no difference in transfusion rate, hospital stay and perioperative complications were noted. As far as oncologic results, no statistical difference was noted in terms of positive surgical margins and postoperative Gleason score between the two groups. Also, regarding functional results, patients in both groups reported high rates of continence at baseline, 6 months and 12 months postoperatively with full continence rising up to 94.3% among all patients 12 months after surgery. These data support that continence recovery is not compromised in patients undergoing RRP after previous prostate surgery. Erectile function assessed by IIEF-5 demonstrated significantly higher rates among patients who had not undergone TURP, though potency preservation seemed to be equivalent.

In regards to surgical technique, prostatic apex dissection as well as neurovascular bundle preservation, while preserving urethral integrity, appears to be the most challenging steps. In most cases the anastomosis of bladder neck with urethra was technically difficult and we used the traditional Walsh technique (tennis racket reconstruction of bladder neck) due to the wide opening. It was also preferred to keep the urethral catheter in place for more days so we could avoid stricture formation and ensure the integrity of the anastomosis without any urine extravasation.

Neurovascular bundle preservation represents a highly demanding technique in post-TURP patients, since tissue inflammation and fibrosis make anatomy more complicated and elements more difficult to be detected and dissected. That is why there were statistically higher IIEF-5 scores between TURP and non-TURP patients (15.8 and 18.2, respectively, Table 3).

In a similar matched pair analysis by Palisaar et al, RRP after previous TURP was proven to be a safe operation

with no difference in complication rates, postoperative continence, positive surgical margins and preservation of sexual function.¹¹ Gupta et al studied the outcomes of robot-assisted radical prostatectomy (RARP) in men with previous transurethral resection of the prostate. As a result, RARP after TURP was characterized as "challenging" with longer operative time, and increased intraoperative difficulty. Post TURP patients presented with significantly greater blood loss, increased need for bladder reconstruction, higher rates of positive surgical margins and incontinence rates, as well.¹⁰

Zugor's et al study was largely consistent with ours.¹² The authors presented their results in post-TURP patients who were offered RARP, subsequently. They did not observe differences in oncologic or functional outcomes between this cohort and men without prior TURP. Regarding erectile function, we also had comparable rates between the two groups, though IIEF-5 evaluation revealed significant differences.

Other forms of surgical treatment for benign prostatic hyperplasia, such as the holmium laser enucleation (HoLEP) also have similar anatomical effects on the prostate; however, they do not seem to compromise the perioperative and functional outcomes after RRP.¹³

A considerable particularity of our study is that radical prostatectomy was performed straight after transurethral prostatic resection based on its biopsy results. This makes our approach more challenging and differentiates it from the studies which refer radical treatment due to rising PSA in patients with a history of TURP.

Admittedly, the results of our study are far from conclusive. The main limitations are the rather small cohort of patients, as well as the lack of long term data regarding oncologic outcomes and biochemical failure rates.

Conclusions

RRP after previous TURP is a safe procedure in the hands of experienced surgeons in high volume centers. As a result, a previously performed TURP does not seem to compromise functional and oncologic outcomes and it should be offered as treatment option in patients with incidentally diagnosed prostate cancer after prostate surgery for bladder outlet obstruction and LUTS.

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