Laparoscopic Radical Prostatectomy after Previous Transurethral Resection of the Prostate in Clinical T1a and T1b Prostate Cancer: A Matched-Pair Analysis

Yi Yang,[1] Yun Luo,[1] Guo-Liang Hou,[2] Qun-Xiong Huang,[1] Min-Hua Lu,[1] Jie Si-tu,[1] Xin Gao[1]*

Purpose: To analyze and compare surgical, oncological and functional outcomes of laparoscopic radical prostatectomy (LRP) in patients with and without previous transurethral resection of the prostate (TURP).

Materials and Methods: In total, 785 men underwent LRP at our institution from January 2002 to December 2012. TURP had been performed previously in 35 of these patients (TURP group). A matched-pair analysis identified 35 additional men without previous TURP who exhibited equivalent clinicopathological characteristics to serve as a control group. Perioperative complications and surgical, functional, and oncological outcomes were compared between the two groups.

Results: The groups were similar in age, body mass index, serum prostate-specific antigen level, and pre- and post-operative Gleason scores. Patients in the TURP group had greater blood loss (231 vs. 139 mL), longer operative times (262 vs. 213 min), a greater probability of transfusion (8.6% vs. 0%), and a higher rate of complications (37.1% vs. 11.4%) compared with the control group. The positive surgical margin rate was higher in the TURP group, but this difference was not statistically significant ($P = .179$). The continence rates at one year after surgery were similar, but a lower continence rate was identified in the TURP group (42.9% vs. 68.6%) at 3 months. Biochemical recurrence developed in 17.1% and 11.4% of the patients in the TURP and control groups, respectively, after a mean follow-up of 57.6 months.

Conclusion: LRP is feasible but challenging after TURP. LRP entails longer operating times, greater blood loss, higher complication rates and worse short-term continence outcomes. However, the radical nature of this cancer surgery is not compromised.

Keywords: laparoscopy; prostatectomy; methods; prostatic neoplasms; surgery; blood loss; operative time; transurethral resection of prostate; postoperative complications; adverse effects; treatment outcome.

INTRODUCTION

It is fairly common for patients with clinically localized prostate cancer (PCa) to undergo transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH). The rate of PCa that is detected on histopathological examination of TURP chips using normal range age-specific serum prostate-specific antigen (PSA) levels and negative digital rectal examination findings is 6.4%.[1] It is considered that the presence of periprostatic fibrosis, scar tissue and inflammation after previous TURP may hinder optimal outcomes for radical prostatectomy.[2] Historically, open retropubic radical prostatectomy (RRP) after previous TURP was associated with poor surgical, pathological, and functional outcomes.[3] During the past years, laparoscopic radical prostatectomy (LRP) has become a more commonly performed procedure for the treatment of localized PCa.[4,5] LRP has the advantages of clearer fields of vision, better preservation of anatomical structures, a shorter period of convalescence and less blood loss compared with RRP, and it seems ideal for the navigation of difficult tissue planes in a previously treated surgical field.[6,7] Menard and colleagues[1] showed that LRP could be performed after prior TURP without compromising the oncological results but with worse intraoperative and postoperative outcomes. However, several studies have shown no difference in complication rates or morbidity, and the opportunity for surgical cure was comparable to patients without previous TURP, although LRP was technically more difficult.[8] There are a few published data of a limited number of patients exploring the influence of previous TURP on LRP, but no consensus has been reached. Limited reports are available on the long-term oncological and functional results in patients with a history of TURP who undergo LRP. To our knowledge, there is a lack of published data on outcomes of LRP in patients with previous TURP in China. In this retrospective review, we assessed the perioperative, oncological and functional outcomes of patients with a history of TURP who underwent LRP.

MATERIALS AND METHODS

Study Design

A total of 785 men underwent LRP at our institution from January 2002 to December 2012. All of their

[1]Department of Urology, The Third Affiliated Hospital, Sun Yat-sen University, Guangzhou, 510630, China.
[2] Department of Urology, Foshan First Municipal People's Hospital, Foshan, 528000, China.
*Correspondence: Department of Urology, The Third Affiliated Hospital, Sun Yat-sen University, Tianhe Road 600, Guangzhou, 510630, China.
Tel: +86 20 85252990. Fax: +86 20 85252678. E-mail: urogx@hotmail.com
Received June 2015 & Accepted June 2015

Table 1. Comparison of perioperative parameters between the 2 study groups.

Parameters	TURP Group	Control Group	*P* Value
Patients (n)	35	35	
Age (years)			.56
Mean	69.9	68.9	
Range	54-82	51-79	
BMI (kg/m^2)			.883
Mean	23.2	23.2	
Range	22-25.5	20.2-25.6	
ASA score (n)			.597
1	26	24	
2	9	11	
Prostate volume (mL)			< .001
Mean	19.2 ± 5.6	34.4 ± 15.5	
Range	10.3-37.1	11.6-76.7	
Biopsy Gleason score			.773
Mean	6.5	6.6	
Range	4-9	4-9	
PSA (ng/mL)			.474
Mean	9.21	10.49	
Range	0.624-20.73	1.73-26.67	
Clinical T stage (n)			
T1a	5		
T1b	30		
T1c		19	
T2a		14	
T2b		2	
Interval between TURP and LRP (weeks)			
Mean	7.5		
Range	1-12		
Access (n)			.003
Transperitoneal	15	27	
Extraperitoneal	20	8	
Operative time (min)			< .001
Mean	262	213	
Range	165-370	120-305	
Estimated blood loss (mL)			.002
Mean	231	139	
Range	100-800	50-300	
Transfusions (n)	3	0	
Lymphadenectomy (n)			1.0
Yes	30	30	
No	5	5	
Nerve sparing (n)			.001
None	26 (74.3)	14 (40)	
Unilateral	3 (8.6)	4 (11.4)	
Bilateral 6 (17.1)		17 (48.6)	
Complications (n)	13 (37.1)	4 (11.4)	.012
Minor (Clavien I-II)	9	2	
Anastomosis leakage	9	2	
Urinary infection	3	0	
Major (Clavien III-IV)	4	2	
Rectal injury	2	0	
Anastomotic stricture	4	2	

Abbreviations: BMI, body mass index; PSA, prostate specific antigen; ASA, American Society of Anesthesiology; TURP, transurethral resection of prostate; LRP, laparoscopic radical prostatectomy.
Data in parentheses are percentages. The level of statistical significance was defined as $P < .05$.

clinical data were recorded in our database. A prior conventional TURP for bladder outlet obstruction had been performed in 35 patients. The TURP group consisted of patients with PCa that was incidentally diagnosed following TURP (Stage T1a, T1b). This group included patients who had undergone preoperative transrectal ultrasound-guided systematic 12-core prostate biopsy because of elevated serum PSA levels, but the histopathology showed only BPH. A match-paired analysis was performed using our database to identify men without a history of TURP with equivalent clinicopathological characteristics to serve as the control group (non-TURP group). Matching criteria included, age, body mass index (BMI), American Society of Anesthesiology (ASA) score, preoperative serum total PSA level, preoperative Gleason score, and pelvic lymph node dissection. The patients in the control group had all undergone transrectal ultrasound-guided biopsies demonstrating PCa. The 2002 American Joint Committee on Cancer (AJCC) TNM staging of PCa was used for both clinical and pathologic staging. Gleason score was evaluated by dedicated pathologist according to the International Society of Urological Pathology (ISUP) 2005 guidelines.[9]

Treatment Plan

A single surgeon (X.G.) performed all of the LRPs using a transperitoneal or extraperitoneal approach as described previously.[10] Pelvic lymph node dissection was performed in all patients with a serum PSA level > 10 ng/mL and/or a Gleason score > 6. Complications were evaluated according to the Clavien-Dindo Classification.[11] All of the patients underwent cystography 7-10 days after surgery. Anastomotic leakage was defined as the presence of extravasation on cystography. The catheter was removed if no extravasation was recorded.

Follow-up

A 3-monthly follow-up was conducted to assess long-term oncological and functional outcomes. The mean follow-up period was 57.6 months (range 30–107). Continence was evaluated using the International Continence Society (ICS) questionnaire. A requirement for > 1 pad daily with normal physical activity was considered incontinence. Biochemical recurrence was defined as 2 consecutive detectable serum PSA levels > 0.2 ng/mL. No patients received adjuvant hormonal therapy or radiotherapy without a PSA level higher than 0.2 ng/mL.

Match-Paired Analysis

Preoperative clinicopathological characteristics (age, BMI, prostate size, clinical stage, serum PSA level, preoperative Gleason score, and continence), intraoperative characteristics (neurovascular bundle [NVB] preservation, lymph node dissection, estimated blood loss, need for transfusion, operative time, and intraoperative complications), postoperative oncological characteristics (Gleason score, pathological stage, positive surgical margin [PSM] and positive lymph nodes), postoperative complications, biochemical recurrence, and continence were compared between the TURP and control groups.

Statistical Analysis

We compared the two groups using one-way analysis of variance or Student's t test for numeric values and a chi-squared test for non-numeric values. The univariate and multivariate models were performed for urinary function in combination with time of continence with a correction in imbalance factors. Pear-

son's contingency coefficient test was performed for a correlation analysis between continence (n) and biochemical recurrence (n). The data were analyzed using Statistical Package for the Social Science (SPSS Inc, Chicago, Illinois, USA) version 19.0. A P value < .05 was considered statistically significant.

RESULTS

Patient Characteristics

This study was conducted in accordance with the guidelines of the Ethics Committee of the Third Affiliated Hospital of Sun Yat-sen University. Comparative data on the two groups are provided in **Table 1**. Both groups were similar in age, BMI, preoperative Gleason score, serum PSA level, and the requirement for lymphadenectomy. A significant difference was observed between prostate volume in the TURP group vs. the control group (19.2 ± 5.6 vs. 34.4 ± 15.5 mL, P < .001). The mean time interval between TURP and LRP was 7.5 weeks and ranged from 1 to 12 weeks (**Table 1**). The mean operative time was 49 min longer for the TURP group than the control group (262 vs. 213 min, P < .001). Intraoperative blood loss data were obtained from the anesthesia records. The mean estimated blood loss was 231 mL in the TURP group compared with 139 mL in the control group (P < .001). The intraoperative blood transfusion rate was 8.6% in the TURP group, and no patient needed transfusion in the control group. A nerve-sparing procedure was performed in only 25.7% of patients in the TURP group (unilaterally in 3 and bilaterally in 6) compared with 60% of patients in the control group (unilaterally in 4 and bilaterally in 17) (P = .001). Fourteen patients (40%) in the control group chose to maximize oncological safety, and they did not undergo a nerve-sparing procedure. The days of drainage (DD), catheterization (DC), and hospital stay (HS) was 3~5, 7~10 and 10~14 in both groups, respectively. No perioperative mortality was observed in either group.

Complications

A statistically significant difference in the complication rate was observed between the TURP group and the control group (37.1% vs. 11.4%, P = .012). The most common complication was anastomosis leakage, which was significantly higher in the TURP group than the control group (34.3% vs. 5.7%, P = .003). Rectal injury occurred in 2 men in the TURP group. Three patients in the TURP group developed urinary infections. Anastomotic strictures developed in 4 patients in the TURP group and in 2 patients in the control group. However, the stricture rate between the groups was not significantly different. These patients underwent bladder neck incision as and when the stricture developed, and good outcomes were achieved.

Oncological Results

Pathological results and follow-up information are shown in **Table 2**. No significant difference in post-operative Gleason scores was observed between the two groups. The percentage of Gleason scores ≥ 8 in the TURP group was somewhat higher than the control group, but this difference was not significantly different. PSM was defined as the presence of tumor cells at the inked surface of the resected specimen. The overall PSM rate was 34.3% for the TURP group compared with 20% for the control group (P = .179). Eight patients in the TURP group had positive nodes compared with 4 patients in control group. These patients were immediately started on hormonal ablation. There were no biochemical recurrence cases in 3 months postoperatively. Biochemical recurrence occurred in 6 and 4 patients in the TURP group and control group, respectively, after a mean follow-up of 57.6 months (range 30–107). Only 1 patient in the TURP group died of PCa.

Table 2. Pathological results and follow-up information of the 2 study groups.

Parameters	TURP Group	Control Group	*P* Value
Post-operative Gleason score			.569
Mean	6.9	6.7	
Range	4-9	4-9	
Gleason score group			.466
≤ 6	14 (40)	14 (40)	
7	8 (22.9)	12 (34.3)	
≥ 8	13 (37.1)	9 (25.7)	
PSM (n)	12 (34.3)	7 (20)	.179
pT2	2	3	
pT3a	5	3	
pT3b	3	1	
pT4	2	0	
Nodes positive (n)	8 (22.9)	4 (11.4)	.205
Pathological T stage (n)			.127
T2	25 (71.4)	30 (85.7)	
T3a	5 (14.3)	3 (8.6)	
T3b	3 (8.6)	1 (2.9)	
T4	2 (5.7)	1 (2.9)	
Biochemical recurrence (n)	6 (17.1)	4 (11.4)	.495
Prostate cancer-specific mortality (n)	1	0	1.0
Continence at last follow-up (n)	30 (85.7)	33 (94.3)	.428

Abbreviations: PSM, positive surgical margin; TURP, transurethral resection of prostate.
Data in parentheses are percentages. The level of statistical significance was defined as P < .05.

Functional Results

All of the patients were continent preoperatively. The continence rates at 3 months were significantly higher in the control group than in the TURP group (68.6% vs. 42.9%, P = .03). However, no statistically significant difference was found between the 2 groups at 12 months after LRP. At last follow-up, continence was achieved in 85.7% of patients in the TURP group and in 94.3% of patients in the control group. Univariate (hazard ratio [HR] = 1.355, 95% confidence interval [CI]: 0.823-2.232, P = .233) and multivariate (HR = 1.324, 95% CI: 0.654-2.677, P = .435) analysis showed that there were no significant difference in urinary continence between the 2 groups. Besides, Pearson's contingency coefficient test showed that the correlation was not significant between urinary continence and biochemical recurrence status.

DISCUSSION

The relative paucity of PCa patients who have undergone a previous TURP makes any comparative analysis somewhat difficult. However, several studies on this subject have been reported. Most of these studies have focused only on histopathological or surgical results rather than long-term oncological results and functional outcomes. Our literature review did identify few studies that addressed LRP after previous TURP in Chinese patients. The present study used a matched-pair design to compare the perioperative, oncological, and functional results of LRP in Chinese patients with and without previous TURP. TURP results in periprostatic edema, inflammation and fibrosis, and distortion of the proper surgical plane, which increases the difficulties of subsequent procedures. Therefore, the optimal time interval between TURP and LRP is theoretically when the reactive inflammation and fibrosis is lightest. Elder and colleagues[12] recommended performing surgery either during the first month after TURP or to wait until 4 months after TURP. Zugor and colleagues[6] suggested a time interval between TURP and RP of at least 3 months in an attempt to decrease the amount of possible postoperative inflammation. The mean time interval between TURP and LRP was 7.5 weeks (range 1 to 12 weeks) in this study, which is a shorter interval than the time recommended previously. We found that the periprostatic edema in this interval was indeed severe in some cases. However, the optimal time interval was impossible to evaluate in this study because no LRP was performed later than 3 months after TURP. Several studies reported that surgical procedures after TURP are challenging.[2,8,13,14] To our experience, there are several concerns during the procedure with respect to the post TURP scenario. (i) It is difficult to identify the prostatovesicular junction after the removal of prostatic tissue during TURP. (ii) Urethrovesical anastomosis becomes technically difficult after previous TURP because of rigidity of the bladder neck and the loss of elasticity in the urethra.[13] (iii) The need for bladder neck reconstruction is increased because preservation of the bladder neck after TURP is difficult. Katz and colleagues[13] did not attempt to preserve the bladder neck but instead made a wide incision and redesigned the bladder neck in the form of a racket handle to increase the distance between the ureteral orifices and the region of the urethrovesical anastomosis. (iv) Posterior dissection is difficult, which increases the risk of rectal injury because of periprostatic adhesions and fibrosis. (v) The tumor that is diagnosed by TURP chips was usually located in the transitional zone. Therefore, seminal vesicular involvement may be increased because a transitional zone tumor may spread easily via the ejaculatory ducts. (vi) The risk of anastomotic leakage and incontinence may be increased because the bladder neck becomes thickened, fibrotic, and rigid after previous TURP. (vii) The NVBs were less dissociable from the prostatic capsule after previous TURP because of periprostatic adhesions. The influence of previous prostate surgery on the outcome of radical prostatectomy remains controversial, except for the intraoperative difficulties.[8,15] One proposed hypothesis is that previous TURP increases intraoperative and postoperative morbidity and complicates oncological and functional outcomes in patients undergoing LRP because of the difficult dissection resulting from the obscured planes caused by periprostatic inflammation and fibrosis. The existing literature suggests that relatively poorer outcomes are achieved in men with previous prostatic surgery.[16,17] One study of 117 patients reported that patients with a history of TURP who underwent LRP had worse outcomes of operative time, overall complication rate, and functional outcomes.[2] However, several previous studies demonstrated that although surgery may be technically more difficult, overall morbidity and long-term functional or oncological outcomes are not compromised.[1,7,13,18] Our study encountered longer operative times, greater intraoperative blood loss, and higher blood transfusion rates in the TURP group. These results may be attributed to the extravasation of blood and fluid irrigation during TURP, which resulted in periprostatic fibrosis and obscured the proper planes between tissues. The preoperative biopsy also induces some inflammatory and fibrotic reactions in and around the prostate, but these reactions are much lighter than TURP-induced reactions.[19] Anastomotic leakage rates were much higher in the TURP group. Jaffe and colleagues[2] found that patients with previous TURP had a significantly higher rate of anastomotic leakage (15.1%) following LRP than patients without previous surgery (6.7%). One possible explanation is that the scarring and fibrosis of the previously resected bladder neck complicates healing at the anastomosis. Some studies demonstrated that NVB preservation was technically feasible in approximately 33% to 56.5% of LRP patients after TURP.[1,18] The isolation and preservation of NVB in our study was technically feasible in only 25.7% of patients in the TURP group compared to 60% in the control group. As reported by Colombo and colleagues,[19] this reduced preservation may result from the more difficult dissection of the NVBs because of periprostatic fibrosis. Nerve-sparing techniques maybe have a significant effect on urinary continence because the autonomic nerve fibers from the pelvic plexus innervate the sphincteric mechanism.[20,21] Do and colleagues[22] investigated a series of 100 patients who had undergone LRP after previous TURP and showed that 93% of patients were continent at 12 months, but data of NVB preservation were not shown. Teber and colleagues demonstrated that previous TURP was associated with a lower continence rate than the control group at 3 months (49.1% vs. 61.8%).[23] Similar outcomes were encountered in our study. Therefore, patients with a history of TURP should be informed of the potential risk of delayed continence before surgery.

Several studies reported higher PSM rates (21.8%–34.2%) in patients who underwent LRP after TURP.[2,8] Katz and colleagues[8] noted positive margins in 12 of 35 patients who underwent LRP after previous TURP, including 22.2% of patients with pT2 and 75% of patients with pT3. Jaffe and colleagues[2] reported a greater overall PSM rate after TURP, but they did not detail the pathological stage. In contrast, other studies did not detect these differences.[1] Our study found no significant difference between the two groups. One possible explanation for the somewhat higher PSM rate in the current series is the difficulty in the identification of the proper surgical planes because of periprostatic inflammation and fibrosis after TURP.[24] PSMs were associated with biochemical progression in 21% to 30.8% of patients, depending on the location of the positive margins.[25] Our study found a higher biochemical recurrence rate in the TURP group than the control group (17.1% vs. 11.4%, respectively, $P = .495$) after a mean follow-up of 57.6 months, but this difference was not statistically significant. This result may be explained by the higher PSM rate, higher lymph-positive rate, and the greater percentage of cases with Gleason scores ≥ 8 in the TURP group. These findings should be interpreted within the context of the limitations of our study. There was a statistically significant difference in clinical stage between the two groups. However, 94.3% of patients in the control group had a T stage ≤ T2a. This difference could potentially limit the study. However, we believe that the results were not affected, because T stage ≤ T2a would be grouped as low risk according to the D'Amico classification. The time interval between TURP and LRP was not standardized because this study was a retrospective review. This factor may limit the results of the study. The procedural approach is another potential limitation of the study. LRP was transperitoneally performed in 42.9% and 77.1% of patients in the TURP group and control group, respectively. However, a previous study reported that these two techniques exhibited equivalent perioperative, oncological and functional results.[26] Therefore, this fact does not likely limit the findings in this study. Still, we have to acknowledge that a matched-pair analysis has certain limitations in this study and a relatively low number of total patients in both groups also may reduce the persuasion of research results. Besides, quality of life questionnaire (such as continence) for patients was also influenced by many factors.

CONCLUSION

Previous TURP may cause technical difficulties during LRP. LRP after TURP is associated with a longer operating time, greater blood loss, difficult NVB preservation, a higher rate of anastomosis leakage and worse short-term continence outcomes compared to TURP naïve cases. The follow-up data suggest that LRP after TURP can be safely performed without compromising the radical nature of cancer surgery and long-term continence rate. However, patients should be informed of these potential risks before undergoing LRP.

ACKNOWLEDGMENTS

The authors acknowledge financial support received from the National Natural Science Foundation of China (81201694), the Reserve Personnel Plan of the Third Affiliated Hospital of Sun Yat-sen University and the Specialized Research Fund for the Doctoral Program of Higher Education of China (20120171120059).

CONFLICTS OF INTEREST

None declared.

REFERENCES

1. Menard J, de la Taille A, Hoznek A, et al. Laparoscopic radical prostatectomy after transurethral resection of the prostate: surgical and functional outcomes. Urology. 2008;72:593-7.
2. Jaffe J, Stakhovsky O, Cathelineau X, Barret E, Vallancien G, Rozet F. Surgical outcomes for men undergoing laparoscopic radical prostatectomy after transurethral resection of the prostate. J Urol. 2007;178:483-7.
3. Bandhauer K, Senn E. Radical retropubic prostatectomy after transurethral prostatic resection. Eur Urol. 1988;15:180-1.
4. Ficarra V, Novara G, Artibani W, et al. Retropubic, laparoscopic, and robot-assisted radical prostatectomy: a systematic review and cumulative analysis of comparative studies. Eur Urol. 2009;55:1037-63.
5. Hanchanale VS, McCabe JE, Javlé P. Radical prostatectomy practice in England. Urol J. 2010;7:243-8.
6. Zugor V, Labanaris AP, Porres D, Witt JH. Surgical, oncologic, and short-term functional outcomes in patients undergoing robot-assisted prostatectomy after previous transurethral resection of the prostate. J Endourol. 2012;26:515-9.
7. Suzuki Y, Matsuzawa I, Hamasaki T, Kimura G, Kondo Y. Retrospective study of laparoscopic radical prostatectomy for localized prostate cancer after transurethral resection of the prostate compared with retropubic radical prostatectomy at the same institution. J Nippon Med Sch. 2012;79:416-21.
8. Katz R, Borkowski T, Hoznek A, Salomon L, Gettman MT, Abbou CC. Laparoscopic radical prostatectomy in patients following transurethral resection of the prostate. Urol Int. 2006;77:216-21.
9. Epstein JI, Allsbrook WC Jr, Amin MB, Egevad LL; ISUP Grading Committee. The 2005 International Society of Urological Pathology (ISUP) Consensus Conference on Gleason Grading of Prostatic Carcinoma. Am J Surg Pathol. 2005;29:1228-42.
10. Gao X, Pu XY, Si-Tu J, Huang WT. Single-centre study comparing standard apical dissection with a modified technique to facilitate vesico-urethral anastomosis during laparoscopic radical prostatectomy. Asian J Androl. 2011;13:494-8.
11. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of

6336 patients and results of a survey. Ann Surg. 2004;240:205-13.

12. Elder JS, Gibbons RP, Correa RJ, Jr., Brannen GE. Morbidity of radical perineal prostatectomy following transurethral resection of the prostate. J Urol. 1984;132:55-7.
13. Yazici S, Inci K, Yuksel S, Bilen CY, Ozen H. Radical prostatectomy after previous prostate surgery: effects on surgical difficulty and pathologic outcomes. Urology. 2009;73:856-9.
14. Gupta NP, Singh P, Nayyar R. Outcomes of robot-assisted radical prostatectomy in men with previous transurethral resection of prostate. BJU Int. 2011;108:1501-5.
15. Kanno H, Umemoto S, Izumi K, et al. [Prostate cancer development after transurethral resection of the prostate--histopathological studies of radical prostatectomy specimens]. Nihon Hinyokika Gakkai Zasshi. 2006;97:649-59.
16. Stolzenburg JU, Ho KM, Do M, Rabenalt R, Dorschner W, Truss MC. Impact of previous surgery on endoscopic extraperitoneal radical prostatectomy. Urology. 2005;65:325-31.
17. Bujons Tur A, Montlleo Gonzalez M, Pascual Garcia X, Rosales Bordes A, Caparros Sariol J, Villavicencio Mavrich H. [Radical prostatectomy in patients with history of transurethral resection of the prostate]. Arch Esp Urol. 2006;59:473-8.
18. Eden CG, Richards AJ, Ooi J, Moon DA, Laczko I. Previous bladder outlet surgery does not affect medium-term outcomes after laparoscopic radical prostatectomy. BJU Int. 2007;99:399-402.
19. Colombo R, Naspro R, Salonia A, et al. Radical prostatectomy after previous prostate surgery: clinical and functional outcomes. J Urol. 2006;176:2459-63.
20. Kessler TM, Burkhard FC, Studer UE. Nerve-sparing open radical retropubic prostatectomy. Eur Urol. 2007;51:90-7.
21. Sfoungaristos S, Perimenis P. Bilateral cancer in prostate biopsy associates with the presence of extracapsular disease and positive surgical margins in low risk patients: a consideration for bilateral nerve sparing radical prostatectomy decision. Urol J. 2013;10:966-72.
22. Do M, Haefner T, Liatsikos E, et al. Endoscopic extraperitoneal radical prostatectomy after previous transurethral resection of prostate: oncologic and functional outcomes of 100 cases. Urology. 2010;75:1348-52.
23. Teber D, Cresswell J, Ates M, et al. Laparoscopic radical prostatectomy in clinical T1a and T1b prostate cancer: oncologic and functional outcomes--a matched-pair analysis. Urology. 2009;73:577-81.
24. Ramon J, Rossignol G, Leandri P, Gautier JR. Morbidity of radical retropubic prostatectomy following previous prostate resection. J Surg Oncol. 1994;55:14-9.
25. Pettus JA, Weight CJ, Thompson CJ, Middleton RG, Stephenson RA. Biochemical failure in men following radical retropubic prostatectomy: impact of surgical margin status and location. J Urol. 2004;172:129-32.
26. Cathelineau X, Cahill D, Widmer H, Rozet F, Baumert H, Vallancien G. Transperitoneal or extraperitoneal approach for laparoscopic radical prostatectomy: a false debate over a real challenge. J Urol. 2004;171:714-6.