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KEEP IN MIND OTHER CAUSES THAN INTRINSIC SPHINCTER DYSFUNCTION IN POST-PROSTATECTOMY INCONTINENCE

POST-PROSTATEKTOMİ İNKONTİNANSTA İNTRİNSİK SFİNKTER DİSFONKSİYONU DIŞINDAKİ NEDENLER DE AKILDA BULUNDURULMALIDIR

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Abstract

Objective: This study aims to determine the causes of urinary incontinence and accompanying bladder pathologies in patients with persistent incontinence 12 months after radical prostatectomy.

Methods: Thirty-four patients who underwent open radical retropubic prostatectomy (RRP) due to localized prostate cancer and incontinent after surgery between January 2015 and December 2020 and underwent urodynamic study (UDS) were retrospectively reviewed. All UDSs were performed according to the ICS protocol of good urodynamic practice and assessed by the same doctor. Patients were assessed by demographic and clinical parameters including age, body mass index (BMI), comorbidity, preoperative PSA level, prostate volume (PV), transrectal prostate biopsy Gleason score, clinical stage, pathological ISUP grade, pathological stage, lymph node positivity, international consultation on incontinence questionnaire-short form and subjective questionnaire for daily pad use.

Results: Urodynamic studies showed that 29 patients (85.2%) had intrinsic sphincter deficiency (ISD). Nine (26.4%) of 29 patients with ISD had a secondary diagnosis of overactive bladder (OAB), impaired detrusor contractility (IDC) and OAB+IDC 9 (11.6%), 4 (11.6%), 1 (2.9%), respectively. Nineteen patients (55.8%) had a sole diagnosis of ISD, whereas 15 patients (44.1%) had another primary diagnosis or a secondary diagnosis other than ISD.

Conclusion: Although ISD is the most common cause of persistent urinary incontinence in patients after radical prostatectomy, it should be taken into account that overactive bladder and impaired detrusor contractility are also accompanied by a significant proportion of patients.

Keywords: prostate cancer, post-prostatectomy incontinence, urodynamics.

Öz

Amaç: Bu çalışmada radikal prostatektomiden 12 ay sonra persistan inkontinansı olan hastalarda üriner inkontinans nedenleri ve eşlik eden mesane patolojilerinin belirlenmesi amaçlanmıştır.

Yöntem: Ocak 2015 ile Aralık 2020 tarihleri arasında lokalize prostat kanseri nedeniyle açık radikal retropubik prostatektomi (RRP) uygulanan ve cerrahiden sonra inkontinansı olan ve urodinami yapılmış olan 34 hasta retrospektif olarak incelendi. Tüm ürodinamik çalışmalar, iyi ürodinamik uygulama ICS protokolüne göre yapıldı ve değerlendirmeleri aynı doktor tarafından yapıldı. Hastalar vücut kitle indeksi, komorbidite, ameliyat öncesi PSA düzeyi, prostat hacmi, prostat, prostat biyopsi Gleason skoru, klinik evre, patolojik ISUP grade, patolojik evre, kaçırma anket lenf nodu pozitifliği, uluslararası inkontinans sorgulama formu–kısa form ve ped kullanımı için öznel anket dahil olmak üzere demografik ve klinik parametreleri ile değerlendirildi.

Bulgular: Ürodinamik çalışmalar 29 hastada (%85.2) intrinsik sfinkter yetersizliği (ISY) olduğunu gösterdi. Bu 29 hastanın 9'unda (%26,4); sekonder aşırı aktif mesane (AAM), bozulmuş detrusör kontraktilitesi (BDK) ve AAM+BDK, sırasıyla 9 (%11,6), 4 (%11,6), 1 (%2,9) hastada saptandı. On dokuz hastada (%55,8) tek ISY tanısı varken, 15 hastada (%44.1) ISY dışında başka bir birincil tanı veya ikincil tanı vardı.

Sonuç: Radikal prostatektomi sonrası hastalarda persistan üriner inkontinansın en sık nedeni intrinsik sfinter yetmezliği olmasına rağmen, hastaların önemli bir kısmında aşırı aktif mesane ve bozulmuş detrüsör kontraktilitesinin de eşlik ettiği göz önünde bulundurulmalıdır.

Anahtar Kelimeler: prostat kanseri, prostatektomi sonrası inkontinans, ürodinami.

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Introduction

Prostate cancer is the second most common cancer among men.[1] Since prostate-specific antigen screening was first introduced in 1987, the diagnosis and incidence of prostate cancer have gradually increased. With the prolongation of life expectancy and the development of surgical techniques, more men are undergoing radical prostatectomy (RP) surgery today. Men subjected to RP have a significantly worse quality of life, and urinary incontinence is one of the most distressing complaints.[2] Although there are several studies investigating surgical techniques to reduce the morbidity of RP[3,4], incontinence remains a serious nuisance for patients. Detection of underlying pathologies is essential to provide appropriate treatment and symptomatic improvement in this large patient group. The most objective method to evaluate the bladder function after RP is urodynamic study (UDS).

This study aims to determine the causes of urinary incontinence and accompanying bladder pathologies in patients with persistent incontinence 12 months after RP.

Methods

This study was approved by the local Ethical Review Committee of our institution (2022/69). All patients consented to the use of their medical and surgical data in the context of this study. Data of the patients who underwent open radical retropubic prostatectomy (RRP) due to localized and locally-advanced prostate cancer and incontinent after surgery between January 2015 and December 2020 were retrospectively reviewed.

Patients who had a history of the urethra, prostate or bladder surgery, preoperative urinary incontinence, neurogenic bladder, overactive bladder, and postoperative urethra or bladder neck stricture, dry or who did not use security pads in postoperative month 12 were excluded. All RRP procedures were performed by two surgeons who are experts in their field.

All patients were followed in our outpatient clinic for the functional and oncological outcomes every three months in the postoperative first year and then 6-month intervals until completion of 5-year. Patients were assessed by demographic and clinical parameters including age, body mass index (BMI), comorbidity, preoperative PSA level, prostate volume (PV), transrectal prostate biopsy Gleason score, clinical stage, pathological ISUP grade, pathological stage, lymph node positivity, international consultation on incontinence questionnaire-short form (ICIQ-SF) and subjective questionnaire for daily pad use. ICIQ-SF forms were filled and evaluated by the urologists during the interview with the patient. Also, urodynamic studies (UDS) were performed by a specialist nurse with and under the supervision of a specialized physician. Before UDS, patients were undertaken for uroflowmetric study for maximum flow rate and ultrasound for residual volume after micturition were performed. All UDSs were performed using the multichannel urodynamic device (MMS/Laborie, Netherlands) according to the ICS protocol of good urodynamic practice.[5] During the procedure, the bladder was emptied with a catheter. A 7 F urethral catheter (T-DOC® Air Charged Catheters) was placed in the urethra, and a 7 F rectal catheter (T-DOC® Air Charged catheters) was placed in the rectum in the lithotomy position. EMG probes were placed. After placing the catheters and probes, cystometry was started by the filling of bladder with saline at rate of 30 mL/min at room temperature at lithotomy position. All UDS examinations and evaluations were assessed by the same doctor.

Statistical Analysis

Categorical data were presented as numbers and percentages. Levene's test was used to determine whether the distributions of continuous variables were distributed normally. Data for variables normally distributed were presented as mean and standard deviations. The frequencies of categorical variables were compared using the Pearson Chi-Square test. All data were statistically analyzed by using SPSS software version 21 (IBM Corp., Armonk, NY) and a p-value was determined as statistically significant for <.05 in 95% confidence interval.

Results

Thirty-four patients fulfilling inclusion criteria were analyzed retrospectively. The mean age of the patients was 63.2 ± 7.1 years. The mean of ICIQ-SF score and the daily pad use were 11.3 ± 3.4 and 3.2 ± 1.1, respectively. Demographics and clinical data of the patients are shown in Table 1. Urodynamic studies showed that 29 patients (85.2%) had intrinsic sphincter deficiency (ISD) (Table 2). Nine (26.4%) of 29 patients with ISD had a secondary diagnosis of OAB (overactive bladder), IDC (intrinsic sphincter deficiency) and OAB+IDC (9 (11.6%), 4 (11.6%), 1(2.9%), respectively (Table 2). Nineteen patients (55.8%) had a sole diagnosis of ISD, whereas 15 patients (44.1%) had another primary diagnosis or a secondary diagnosis other than ISD.

Discussion

Our study shows that the most common cause of post-radical prostatectomy incontinence is intrinsic sphincter deficiency, but it is accompanied by overactive bladder and impaired detrusor contractility in a significant number of patients.

Continence is maintained primarily by the external sphincter after removal of the internal sphincter during radical prostatectomy.[6] The external urethral sphincter complex is primarily located distal to the prostate apex, but an extension of striated muscle is also located inside the apex.[4,7] Full-length preservation of the urethral sphincter has been shown to provide better continence.[4]

Damage to the somatic nerve fibers, which can occur during surgery, is one of the causes of sphincteric dysfunction. The pudendal nerve branches that innervate the external sphincter divide at the level of the urogenital diaphragm and are very close to the prostatic apex dissection and urethral anastomosis area.[8] Another mechanism associated with incontinence is the development of fibrosis at the urethral anastomosis which leads to decreased elasticity of the urethra.[9]

In a urodynamic study performed by Groutz et al. in 83 postprostatectomy incontinence patients, sphincteric insufficiency (88%) was found to be the main cause 10. Likewise, several reports have shown that intrinsic sphincter deficiency was the main cause of post-prostatectomy incontinence.[11–13]

In a prospective urodynamic study, 90% of the patients with postoperative incontinence had ISD and 40% had DO 13. While ISD was not found in any of the patients without incontinence, detrusor overactivity was found in 25.6%.[13]

Previous studies in the literature have reported different rates of de novo detrusor overactivity after RRP, ranging from 2.3% to 54.5% .[13–26] Furthermore, resolution of preoperative DO was reported with the rates of 19.6%-87.5%.[13,17–19,21–24,27,28] However, these studies vary significantly in terms of follow-up length and timings of pre/post-operative urodynamic studies. Differences seen in these studies may be due to differences in study designs, as well as the improvement in detrusor function over time and differences in urodynamic study timings. It should be considered that in our study we only evaluated patients who were incontinent after 12 months of surgery without previously known bladder or urethral dysfunction.

DO and DU are thought to be linked to autonomic nerve injury during surgery.[14,24,25] This is particularly true with dissections at the bladder neck and the excision of the seminal vesicles.[29] It has been suggested that nerve-sparing surgery can also lead to the protection of some autonomic nerves, and pelvic lymphadenectomy in some patients may increase pelvic plexus damage.[30] Many alternative nerve-sparing approaches have been developed to enhance functional results in the case of presumed pathology.[31] As our study was an observational study, more randomized controlled trials are needed to investigate the results of nerve-sparing techniques.

Our study has several limitations. Although we excluded patients with known bladder or urethral pathology, it is not possible to certainly determine the relationship between our findings and surgery, since preoperative urodynamic studies were not performed. Due to retrospective cross-sectional design of our study, a cause and effect relationship could not be evaluated.

Table 1. Demographics and clinical data of the patients

Number of patients	34
Age, mean ± SD, years	63.2 ± 7.1
BMI, mean ± SD, kg/m^2	26.6 ± 3.2
Comorbidity, n (%)	
Diabetes	10 (29.4)
Hypertension	12 (35.2)
PV, mean ± SD, mL	45.0 ± 17.1
PSA, mean ± SD, ng/mL	8.6 ± 6.2
Biopsy Gleason score, n (%)	
≤6	21 (61.7)
7	7 (20.5)
8-10	6 (17.6)
Clinical stage, n (%)	
T1c	13 (38.2)
T2a	9 (26.4)
T2b	7 (20.5)
T2c	5 (14.7)
ISUP classification, n (%)	
1	20 (58.8)
2	9 (26.4)
≥ 3	5 (14.7)
Pathological stage, n (%)	
T2	25 (73.5)
T3a	5 (14.7)
T3b	4 (11.7)
Surgical margin positivity, n (%)	6 (17.6)
Lymph node positivity, n (%)	2 (5.8)
Post-operative RT, n (%)	4 (11.7)
ICIQ-SF score, mean ± SD	11.3 ± 3.4
Number of daily pad use, mean ± SD	3.2 ± 1.1

Abbreviations: SD, standard deviation; BMI, Body mass index; PV, prostate volume; PSA, Prostate-specific antigen; ISUP, International Society of Urologic Pathologists; RT, Radiotherapy; ICIQ-SF, international consultation on incontinence questionnaire-short form.

Conclusion

In conclusion; although ISD is the most common cause of persistent urinary incontinence in patients after radical prostatectomy, it should be taken into account that overactive bladder and impaired detrusor contractility are also accompanied by a significant proportion of patients.

Ethical Approval

Permission for this study was obtained from the Ethics Committee of Bolu Abant Izzet Baysal University Faculty of Medicine, numbered 2022/69.

Conflicts of Interests

No competing interests have been declared by the authors.

Author Contribution

All authors contributed equally to this work.

Financial Disclosure

None.

Table 2. Urodynamic results of patients with post-prostatectomy incontinence

	Urodynamic results			
Variables	**ISD**	**OAB**	**IDC**	***P* value**
Number, n (%)	28 (82.3)	5 (14.7)	1 (2.9)	**<0.001+**
Bladder volume, mean ± SD, mL	270 ± 35	250 ± 40	260 ± 25	0.42
Qmax, mean ± SD, mL/min	15.3 ± 8.5	16.2 ± 8.0	14.0 ± 7.8	0.14
PVR, mean ± SD	25 ± 15	30 ± 10	20± 10	0.23
Sole diagnosis, n (%)	19 (55.8)	3 (8.8)	1 (2.9)	**<0.001+**
Secondary diagnosis, n (%)	9 (26.4)	2 (5.8)		**<0.01+**
OAB	4 (11.6)			
IDC	4 (11.6)	1 (2.9)		
OAB + IDC	1 (2.9)	1 (2.9)		

Abbreviations: SD, standart deviation; ISD, intrinsic sphincter deficiency; OAB, overactive bladder; IDC, impaired detrusor contractility; Qmax, maximum flow rate; PVR, post-voiding residue; mL, milliliter; min; minute. + represents the result of Pearson chi-square test and showed as bold for the statistically significant.

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