

Is High Drain Volume after Retropubic Radical Prostatectomy an Indicator of Bladder Neck Contracture Development?

Retropubik Radikal Prostatektomi Sonrası Mesane Boynu Darlığı Gelişiminde Yüksek Dren Sıvı Hacmi İndikatör müdür?

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ABSTRACT

Aim: The aim of the present study was to evaluate if postoperative drain volume is a risk factor in bladder neck contracture development in patients who underwent retropubic radical prostatectomy.

Methods: The data of 151 patients who underwent radical retropubic prostatectomy by a single surgical team in our clinic between years 2015 and 2020 were analyzed. The demographic informations of patients, preoperative PSA level, prostate volume, Gleason score, pathological stage, operation time, estimated quantity of blood loss, drain removal time, drain volume, having postoperative urinary tract infection and incontinence development were evaluated.

Results: The drain volume of the group with BNC was 1960.23 ± 1492.4 ml while that of non-BNC group was 356.94 ± 624.3 ml. It was observed that postoperative drain volume of the BNC group was higher than the non-BNC group ($p: 0.01$). The mean time till to remove the drain was 8.04 ± 4.63 days in the group with BNC, while it was 3.54 ± 1.77 days. So the mean drain removal time was observed significantly longer in BNC group ($p: 0.02$).

Conclusion: The amount of post-operative drain volume is thought to be indicator of bladder neck contracture development.

Keywords: Retropubic Radical Prostatectomy, Bladder Neck Contracture, Anastomotic Leak

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ÖZET

Amaç: Bu çalışmada retropubik radikal prostatektomi yapılan hastalarda mesane boynu darlığı gelişiminde postoperatif dren miktarının bir risk faktörü olup olmadığı araştırıldı.

Yöntemler: 2015-2020 tarihleri arasında tek cerrahi ekip tarafından yapılan retropubik radikal prostatektomi yapılan hastaların demografik bilgileri, preoperatif PSA, Gleason skoru, patolojik evre, operasyon zamanı, tahmini kan kaybı miktarı, dren alınma süresi, dren çıkış miktarı değerlendirildi.

Bulgular: Retropubik radikal prostatektomi yapılan 133 hasta çalışmaya alındı. 112 hastada mesane boynu darlığı görülmezken 21 hastada mesane boynu darlığı görüldü. Darlık olan grubun dren çıkış miktarı 1960.23 ± 1492.4 ml, darlık olmayan grubun dren çıkış miktarı 356.94 ± 624.3 ml darlık olan grubun dren çıkış miktarı darlık olmayan gruba göre fazla olduğu görüldü ($p: 0.01$). Darlık olan grubun ortalama dren alınma zamanı $8,04 \pm 4.63$ gün, darlık olmayan grubun dren alınma zamanı 3.54 ± 1.77 gün olup darlık olan grubun dren alınma zamanı darlık olmayan gruba göre daha uzun olduğu görüldü ($p: 0.02$).

Sonuç: Retropubik radikal prostatektomi yapılanlarda dren çıkış hacminin fazla olması ile mesane boynu darlığı gelişiminde indikatör olabileceğini düşünüyoruz

Anahtar Sözcükler: Retropubik Radikal Prostatektomi, Mesane Boynu Darlığı, Anastomoz Kaçağı

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INTRODUCTION

Prevalence of bladder neck contracture development after retropubic radical prostatectomy (RRP) has been reported to be 5-32% (1-3). Although the etiology of bladder neck contracture has not been completely elucidated, some factors such as; bleeding, ischemia in the bladder neck or membranous urethra, and unsuccessful apposition of the mucosa have been shown to play role (4,5). Bladder neck contracture may cause additional various morbidity reasons such as urinary retention, infection, later surgical need and impaired urinary continence. Several surgical techniques have been described to reduce the incidence of bladder neck stenosis (6,7). For an optimal anastomosis, the mucosa and urethra should be positioned appropriately to be tension-free and watertight (8). In our study, we investigated whether postoperative drain volume, which is an indicator of anastomotic leakage, is a risk factor in terms of bladder neck contracture formation or not.

METHODS

A group of 151 consecutive patients who underwent radical retropubic prostatectomy by a single surgical team in our clinic between 2015 and 2020 were evaluated. 18 patients who were lost to follow-up were excluded from the study. Bladder neck contracture (BNC) was observed in 21(15.7%) of 133 patients. The parameters such as; demographic data of the patients (age, BMI (body mass index)), preoperative PSA level, prostate volume, Gleason score, pathological stage, operation time, estimated quantity of blood loss, drain removal time, drain volume, having postoperative urinary tract infection and incontinence development were evaluated. All patients were re-examined at the postoperative 3rd, 6th, 9th, 12th, 24th months.

Retropubic radical prostatectomy surgery was performed using the technique as described elsewhere (9). Vesicourethral anastomosis was performed with 6 stitches using 2-0 monofilament sutures. Water-tightness of anastomoses was checked by filling the bladder with saline water through the urethral catheter. In case of leakage was observed, additional suturation was applied.

After the operation, drain volumes were measured daily. The urethral catheter was removed on the 21st days after surgery. At follow-up visits, uroflowmetry and postvoiding residual (PVR) urine volume measurement were performed in each patient. Endoscopic evaluation (with 18fr cystoscope) was carried out for the patients with low urine flow, high PVR urine volume or bladder emptying symptoms. The presence of bladder neck contracture was evaluated. In patients with bladder neck contracture, internal incision was made at 10, 12 and 2 o'clock alignment with urethrotome under endoscopic vision, in the dorsal lithotomy position under spinal anesthesia, after a guidewire was placed through urethra. At the end of the procedure a 20fr sized urethral catheter was placed and the removal of the catheter was three days later.

This retrospective study had been approved by the Local Ethics Committee of Ankara Training and Research Hospital (Number: 0594/5012).

Statistical Analysis

Data analysis was performed with SPSS Windows, version 16 (SPSS Inc., Chicago, IL, USA). Categorical variables of both groups (with and without bladder neck contracture) were compared with the Chi-square and Fisher's exact test. Continuous variables of both groups were analyzed using the Mann Whitney U test. $p < 0.05$ was considered as statistically significant.

RESULTS

The mean follow-up period of patients who underwent RRP was 18.4 months (4-51 months). The mean age of the group with BNC was 63.95 ± 6.54 , while of the non-BNC group was 61.32 ± 4.23 ($p: 0.56$). The BMI of the group with BNC was 28.33 ± 1.77 kg / m², and of the non-BNC group was 29.67 ± 2.11 kg / m² ($p: 0.67$). The mean preoperative PSA levels of the group with BNC and non-BNC group were 6.13 ± 1.4 ng / mL and 6.48 ± 1.1 , respectively ($p: 0.54$). The mean prostate volume of the BNC group was 52.64 ± 28.93 cc, while the mean volume of the non-BNC group was 49.73 ± 16.68 ($p: 0.16$). There was no statistically significant difference in the preoperative prostate biopsy Gleason scores between two groups (Table 1). In the postoperative staging, both groups were compared after defining stage T2 and below as low, stage T3 and above as high.

There was no statistically significant difference between the two groups in terms of staging ($p: 0.64$ $p: 0.72$). The mean operation time of the group with BNC was 286.35 ± 103.1 minutes, while it was 273.68 ± 121.46 minutes in non-BNC group ($p: 0.18$). Estimated amount of blood loss in the BNC group was 1613.49 ± 2114.28 ml, in the non-BNC group that was 1854.4 ± 1342.64 ml ($p: 0.48$). There was no statistically significant difference between both groups in terms of postoperative infection and incontinence rates ($p: 0.87$, $p: 0.54$). The drain volume of the group with BNC was 1960.23 ± 1492.4 ml while that of non-BNC group was 356.94 ± 624.3 ml. It was observed that postoperative drain volume of the BNC group was higher than the non-BNC group ($p: 0.01$). The mean time till to remove the drain was 8.04 ± 4.63 days in the group with BNC, while it was 3.54 ± 1.77 days. So the mean drain removal time was observed significantly longer in BNC group ($p: 0.02$).

Table 1: Preoperative prostate biopsy Gleason scores.

Variable	BNC(21)	No BNC(112)	P value
Age(year)	63.95± 6.54	61.32±4.23	0,56
BMI (kg/m ²)	28.33±1.77	29.67±2.11	0,67
Preoperative PSA(ng/mL)	6.13±1.4	6.48±1,1	0,54
TRUS volume(gr)	52.64±28.93	49.73±16.68	0,16
Gleason Sum (%)			
≤6	7(33,33%)	40(35,71%)	0,94
7	12(57,14%)	59(52,67%)	0,87
≥ 8	2(9,52%)	13(11,60%)	0,71
Pathologic T stage			
≤T2	17(80,95%)	92(82,14%)	0,64
≥T3	4(19,04%)	20(17,85%)	0,72
Operation time (min)	286.35±103.1	273.68±121.46	0.18
Estimated blood loss(ml)	1613.49±2114.28	1854.4±1342.64	0.48
Length of time before drain removal(d)	8,04±4.63	3.54±1.77	0.02
Drain output (ml)	1960.23±1492.4	356.94±624.3	0.01
Postoperative urinary tract infection(yes/no)	2/19	12/100	0.87
Incontinence(yes/no)	3/18	11/101	0,54

DISCUSSION

BNC is seen in 0.5-32% of patients as a late complication after radical prostatectomy (10). Although the BNC mechanism after radical prostatectomy is not completely understood, BNC can be present already preoperatively or thought to develop due to perioperative variables (11,12). Existing risk factors can change the healing process of the vesicourethral anastomosis. As a result of the inflammatory response in the peri-vesicourethral anastomosis area, it may turn into scar formation with stress formation in the anastomosis area. Adequate microvascular formation is important in the healing process of the anastomosis. However, comorbidities of the patient such as smoking behavior, diabetes, coronary artery disease, etc. may play a role in the formation of BNC (13). BNC development rates after RRP are higher in patients who underwent previous TUR-P surgery, because of the deterioration of vascular structure of the bladder neck (14).

A study evaluated the predictive risk factors for development of BNC after RRP. They reported these factors as; age, stage, PSA level, pathologic grade, neoadjuvant therapy, intraoperative blood loss, operation duration, nerve preservation, urinary extravasation, surgical margin, bladder neck anastomosis type, operation year and surgical experience (15).

Borboroglu et al. found the rate of BNC after RRP to be 11.1% in their study including 467 patients. While smoking was shown as the most important risk factor (26%), comorbid diseases such as hypertension, coronary artery disease and diabetes mellitus were associated with the development of BNC.

TUR-P history, anastomotic suture type, urethral catheter size and length of hospital stay were found as factors that were not associated with the development of BNC. (16) In another study, predictive factors in terms of BNC formation were determined as smoking, previous TUR-P history, postoperative anastomotic leak, asymptomatic bacteriuria, and blood loss. (17) In a similar study by Heckman et al. defining an alternative anastomosis technique in RRP, elder age and quantity of blood loss were determined as predictive risk factors for the development of BNC (18). In our study comparing the volumes of drain in patients who underwent RRP, either BNC developing and not developing, high drain volume was found to be significant to cause BNC (P: 0.01). It was found that the time elapsed till drain removal was longer due to elongated and higher volume drainage (P: 0.02). Also it was found that there was no significant difference in age and quantity of blood loss between the groups; with BNC and non-BNC (Table 1).

On the other hand, Schatzl et al. (19) reported that the amount of postoperative drain after RRP did not increase the risk of BNC development. Urinary extravasation was evaluated with cystogram, and urinary extravasation was found as unrelated to BNC. In a study by Hanson et al. (20), a significant change in BNC development was not found, although urinary extravasation decreased after performing a mucosa to mucosa and watertight anastomosis in robot-assisted radical prostatectomy.

However, this study has some limitations; being retrospective and including single center. And the low rate of BNC formation caused the BNC group to have a low sample size. Also drain volume may vary with urinary extravasation, lymphatic fluid, serous fluid and hemorrhage.

CONCLUSION

The amount of post-operative drain volume is thought to be indicator of bladder neck contracture development.

Conflict of interest

No conflict of interest was declared by the authors.

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