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Surgical and functional outcomes of radical retropubic prostatectomy after biopsy-related acute prostatitis

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Introduction The present study sought to evaluate the intraoperative, postoperative, oncologic, and functional results of radical prostatectomy (RP) after previous prostatitis.

Material and methods We retrospectively reviewed available data of 320 patients undergoing open radical prostatectomy between 2010 and 2016. From this group, 23 (7.2%) had previous transrectal prostate biopsy-related acute prostatitis history. The perioperative and postoperative data were statistically compared between Group 1 (with previous prostatitis) and Group 2 (without previous prostatitis). The variables that were evaluated included demographic characteristics, perioperative complications, functional and oncological outcomes.

Results In Group 1, the operative time, hospitalization and bladder catheterization time was statistically increased by 40 min, 1.9 days, and 2.5 days, respectively ($p < 0.001$, $p < 0.001$, $p = 0.02$). The positive margin rate was not significantly different between the two groups ($p = 0.64$). The rate of complications with Clavien >2 increased in Group 1 (G1 26% vs. G2 12%) ($p = 0.02$). Neurovascular bundle preservation ratio was statistically higher in Group 2 (G1 46.5% vs. G2 76.9%) ($p = 0.02$). The functional results were similar for both groups 12 months after surgery.

Conclusions Previously, transrectal prostate biopsy-related acute prostatitis history was associated with a higher operative time, hospitalization and bladder catheterization time, and perioperative complications during RP. According to our study, although the neurovascular bundle preservation is technically more difficult, potency and urinary continence rate was not affected by previous prostatitis history. However, further studies are still required to confirm these results.

Key Words: erectile dysfunction ‹› prostatectomy ‹› prostatitis ‹› complication ‹› incontinence

INTRODUCTION

Acute bacterial prostatitis is an acute infection of the prostate gland that can cause systemic symptoms (fever, chills, malaise, nausea and vomiting) and voiding symptoms (dysuria, voiding difficulty, increased urinary frequency and urgency) [1, 2]. Most cases can be diagnosed with a convincing history and physical examination [3]. Generally, acute bacterial prostatitis is caused by an ascending urethral infection or intraprostatic reflux [4, 5, 6]. Most of these infections may occur from direct inoculation after transrectal prostate biopsy and transurethral manipulations [7]. Direct or lymphatic spread from the rectum or hematogenous spread via bacterial sepsis can cause acute bacterial prostatitis [8]. For diagnosing prostate cancer (PCa), transrectal ultrasound-guided prostate biopsy (TRUS-TRBx) is generally accepted as a standard procedure [9].

However, despite their large application, TRUS biopsies are associated with higher rates of post-biopsy infections and sepsis because of rectal mucosa

multi-resistant bacteria inoculation within the urinary tract [10].
The incidence of acute bacterial prostatitis (ABP) because of TRBx (Bx-ABP) has increased in the last 10 years, possibly because of an increase in the quinolone-resistant Escherichia coli in the community [11, 12, 13].
The impact of prostate biopsies and their possible complications on the prostate surrounding tissues has attracted considerable interest. However, there is still no evidence in the literature that demonstrates whether previous biopsy-related prostatitis history can have an impact on an eventual radical prostatectomy.
In this study, we aimed to investigate and compare the morbidity and functional results after radical retropubic prostatectomy with and without previous transrectal prostate biopsy-related acute prostatitis history.

MATERIAL AND METHODS

From May 2010 to June 2016, 320 patients underwent open radical retropubic prostatectomy, from which 23 (7.2%) had previous transrectal prostate biopsy-related acute prostatitis history and were thus included for this study. The patients who had repeated biopsy history were excluded.
Acute prostatitis diagnosis was made after the patient showed signs of a fever higher than 38°C, leukocyte presence in urine sediment and bacterial proliferation in urine or blood samples.
Patients with suspected acute prostatitis were hospitalized and treated with IV fluids and empirical antibiotics. There after, those patients were treated according to urine culture antibiogram.
The perioperative and postoperative data were compared between Group 1 (with previous prostatitis) and Group 2 (without previous prostatitis). There were no known cases of previous chronic bacterial prostatitis in Group 1 and Group 2.
The variables considered for evaluating perioperative outcomes were time to surgery, surgical time, estimated blood loss, perioperative complications and length of hospital stay. Time to surgery was calculated using the difference between the date of diagnosis on TRUS biopsy and the date of surgery. A positive surgical margin was considered for oncological outcomes. The severity of surgical complications was graded according to the modified Clavien system [14].
All patients received a confidential questionnaire about their urinary symptoms and sexual function. This questionnaire was derived from the ICS-male questionnaire [15]. The participants were requested to complete the questionnaire 12 months after the surgery. Continence was defined as no pad and/or no urinary leakage. Patients who reported no erections preoperatively and patients receiving postoperative radiotherapy or hormone therapy were excluded from the study. Potency was defined as the ability to achieve and maintain an erection that was suitable for sexual intercourse.
Continuous variables were reported as mean values (SD). Student's t-test or Mann–Whitney U test were used to compare continuous variables, whereas Pearson's Chi-square test was used to compare categorical variables. The Kolmogorov–Smirnov test was used to evaluate sample distribution. Statistical results were considered significant at a level of $p < 0.05$. All statistical analyses were performed using SPSS software version 22 (SPSS Inc., Chicago, IL, USA, IBM®).

RESULTS

A total number of 320 patients were included. There were 23 patients in Group 1 (7.2%) and 297 patients in Group 2 (92.8%). There was no difference in the mean age, BMI, D'Amico clinical stage, ASA score, mean time to surgery, mean total PSA and prostate sizes between these groups (Table 1).
Table 1 lists the baseline characteristics of the 320 included patients. In Group 1, the operative time, hospitalization and bladder catheterization time was statistically increased by 40 min, 1.9 days, and 2.5 days, respectively ($p < 0.001$, $p < 0.001$, $p = 0.02$) (Table 2). The positive margin rate was not significantly different between the two groups ($p = 0.64$)

Table 1. *Demographic data*

	Group 1	Group 2	p
Patient (n)	23	297	
Mean age (y)	62.54 ±3.6	61.28 ±2.1	0.65
BMI (kg/m^2)	25.38	26.22	0.70
Mean Total PSA (ng/ml)	7.6 ±4.3	8.01 ±4.8	0.16
Mean prostate weight (g)	48.9 ±24.7	51.3 ±22.8	0.26
ASA (%)			
1	38.7	37.5	0.74
2	24.5	25.2	0.81
3	36.8	37.3	0.80
Mean time to surgery (days)	84.8	78.5	0.10
Clinical stage (%)			
Low-risk	43.3	43.5	0.75
Intermediate-risk	48	47.8	0.80
High-risk	8.7	8.7	0.90
Lymph node dissection (%)	23	21.8	0.72

BMI – body mass index, ASA – American Society of Anesthesiologists

Table 2. *Perioperative, oncological and functional outcomes*

	Group 1	Group 2	p
Surgical time (min)	248 ±36	208 ±31	<0.001
Mean hospital stay (d)	8.4 ±3.8	6.5 ±2.8	<0.001
Mean catheter time (d)	13.9 ±3.4	11.4 ±4.1	0.02
Blood transfusion (%)	41.2	37.9	0.16
Positive surgical margins	25.2	24.7	0.64
The number of complications with Clavien >2	6 (26%)	36 (12%)	0.02
Complication type (Clavien >2)			
Urinary fistula	1	11	
Sepsis	1	8	
Lymphocele	1	12	
CPR	1	1	
Rectal injury	2	4	
Nerve sparing (%)	46.5	76.9	0.02
Potency with NVB preservation (%)	63.1	68.9	0.57
Continence rate (%)	88.9	94.8	0.61

CPR – cardiopulmonary resuscitation, NVB – neurovascular bundle

(Table 2). A statistically significant difference was observed between the two groups for complications. Complications with Clavien >2 (urinary fistula, sepsis, lymphocele, cardiopulmonary resuscitation (CPR), rectal injury) occurred in 26% of Group 1 and 12% of Group 2 (p = 0.02) (Table 2). Neurovascular bundle (NVB) preservation ratio was statistically higher in Group 2 (76.9%) compared to Group 1 (46.5%) (p = 0.02) (Table 2).

The continence rate was 88.9% in Group 1 and 94.8% in Group 2, respectively, 12 months after the surgery (p = 0.57), whereas the potency rate with neurovascular bundle preservation was 63.1% and 68.9%, respectively (p = 0.61) (Table 2).

DISCUSSION

TRUS-TRBx is generally accepted as a standard procedure for diagnosing PCa. Moreover, direct bacterial seeding from a prostate biopsy is still the most common cause of ABP [16].

Although the incidence of TRUS-TRBx-induced acute prostatitis is low, it is a typically serious complication when it does occur. Despite the use of prophylactic antibiotics, some patients may develop febrile infections or sepsis with a reported incidence of 0–3.5% after the procedure. The incidence of ABP because of TRBx has increased in the last 10 years, possibly because of an increase in drug-resistant strains of bacteria [11, 12, 13].

The impact of prostate biopsies and their possible complications on prostate-surrounding tissues has been an important matter of study. Reports have suggested that TRUS prostate biopsies cause local tissue trauma because of direct damage or due to eventual association to infection complications. Both of these events can result in inflammation and lead to local fibrosis and scar tissue formation [17, 18].

We did not observe any statistically significant difference between the two groups for blood loss; however, the operative time, hospitalization and bladder catheterization times were longer for patients who had previous transrectal prostate biopsy-related acute prostatitis history. In our experience, the operative difficulties were primarily encountered during resection of the posterior part of the bladder neck, as well as when starting dissection of the posterior plane of the prostate in patients who had previous prostatitis history.

These technical difficulties did not seem to influence the oncologic outcomes after RP, as shown by the overall positive surgical margin rate. In fact, we observed an increased surgical complication rate in patients who had previous prostatitis history.

Menard et al. suggested that waiting for at least three months between TURP and RP reduced the effect of postoperative inflammation [19]. The proposed hypothesis is capsular perforation during TURP and extravasation of the irrigation fluid, which causes periprostatic fibrosis [20]. However, the local inflammatory effect of the TRUS biopsy is well established. It is currently recommended to wait at least between 4 and 6 weeks before performing radical prostatectomy after biopsy-related prostatitis. In fact, to minimize potential risks of surgical complications, application of longer intervals (>6 weeks) between biopsy and surgery may be advisable. However, further studies are necessary to confirm this suggestion.

Although the demographic characteristics of these groups were similar, NVBs was technically feasible in only 46.5% of patients in Group 1 and 76.9% in Group 2 according to our study.

In terms of functional results, we observed slightly better results for Group 2 but without statistically significant differences. To our knowledge, this is the first study that demonstrates the effect of biopsy-related prostatitis on the surgical and functional outcomes of radical prostatectomy.

CONCLUSIONS

Radical retropubic prostatectomy can be performed in patients with prostatitis history without compromising oncologic results. However, patients should be informed that this procedure is associated with

worse intraoperative and postoperative outcomes. Although the neurovascular bundle preservation is technically more difficult, potency and urinary continence rates were not affected by previous prostatitis history according to our study. However, further studies are still necessary to confirm these results.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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