Evaluation of Erectile Dysfunction and Risk Factors After Prostate Biopsy

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ABSTRACT

Objective: In this study, we evaluated changes in the erectile function of patients before and after transrectal prostate biopsy (TRUS-Bx) and factors that could effect this change.

Methods: In total, 126 patients who underwent TRUS-Bx for 6 months were evaluated. Those who were diagnosed with prostate cancer, those who had previously undergone biopsy, and those who were re-biopsied were not included. Values of International Erectile Index-5 (IIEF-5), International Prostate Symptom Score (IPSS), prostate volume (PV), prostate specific antigen (PSA), and visual analogue scale (VAS) were recorded before the procedure in all patients. IIEF scores recorded at 1st, 3rd, and 6th months post-procedure. Complications of disease controls were questioned and noted. At the end of the study, data were collected and statistically analyzed.

Results: Mean patient age was 65.5±2.56 years. Initially, mean PSA value was 8.1±0.84 ng/mL, IIEF was 23.49±2.14, IPSS was 10.2±0.95, and PV was 55±4.3. The mean IIEF scores of 1st month was significantly lower than pre-biopsy values (p=0.023). Mean IIEF scores at the 3rd and 6th months were not significantly different from pre-biopsy values (p>0.05). There was no statistically significant difference in IPSS values after biopsy compared to pre-biopsy (p>0.05). The decline in the IIEF score at 1st month was independent of IPSS, PV, age, VAS and PSA values. The mean IIEF values of the patients who developed complications at the 1st month after biopsy were significantly lower than those without complications (17.8±0.9 vs 21.95±0.68).

Conclusion: After TRUS-Bx, erectile dysfunction may be seen in early periods. This loss of erectile function was statistically more significant in patients with complications.

Keywords: Transrectal ultrasound guided prostate biopsy, erectile dysfunction, complications of prostate biopsy

INTRODUCTION

The most commonly used method in diagnosing of prostate cancer is transrectal ultrasound (TRUS) guided prostate biopsy. It was first described in 1989 by Hodge et al. (2). This method can be very uncomfortable for patients with already suspected prostate cancer. After a prostate biopsy, hematuria, hematospermia, pain, a urinary tract infection and acute urinary retention can be seen in relation to the number of cores taken (3).

Erectile dysfunction (ED) can be also observed after a TRUS biopsy. A number of studies on the relationship between ED and prostate biopsy have been published. Although there are theories and hypotheses about this complication, there is no consensus about the definite mechanism (4). In this study, we aimed to evaluate the rate of ED and prostate biopsy risk factors.

METHODS

Patients who underwent prostate biopsy between May and December 2017 were included in the study. The study was conducted in accordance with the Declaration of Helsinki. All patients included in the study were informed about the procedure and the possible side effects. Informed consent was obtained from all patients. Patients who were diagnosed with prostate cancer, who had previously undergone a biopsy, and who had a re-biopsy indication (ASAP, HGPIN, etc.) were excluded from the study. All patients were questioned for the International Prostate Symptom Score (IPSS) and International Erectile Function Form (IIEF-5) before the procedure. Patients were given an oral single dose of 500 mg of ciprofloxacin prophylaxis 45 min prior to the biopsy. Prostate volumes of the patients were determined by horizontal, vertical, and transverse measurements accompanied by TRUS. A TRUS-guided prostate biopsy was performed in the lateral decubitus position with a General Electric 7 MHz device. All patients were administered 20 mg tenoxicam intravenously (iv) 15 minutes prior to biopsy and 2% lidocaine gel by transrectal route 5 minutes prior to biopsy, and prostate massage was done. Since they were selected from primary biopsy patients, 12 quadrant biopsies were performed in all patients. During the procedure, all patients were evaluated for the Visual Analog Scale (VAS), and the pain level was measured. After the patients were informed

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about the possible side effects, they were called to the outpatient clinic follow-up at 1 month, 3 months, and 6 months, and the IIEF and IPSS were questioned. Those with ED were informed that this side effect was usually psychogenic in origin and would generally improve over time. Patients whose biopsy results were showing prostate cancer and indicating need for re-biopsy such as like ASAP, multiple HGPIN, and inadequate samples were excluded from the study. Those who scored 0-7 points according to the IPSS were included in the mild group, 8-19 points in the moderate group, and 20-35 points in the severe group. According to the IIEF score, scores 26-30 were grouped as no ED, 22–25 as mild ED, 17-21 mild-to-moderate ED, 11-16 moderate ED, and 0-10 as severe ED.

The recorded information of the patients was documented in the Microsoft Excel program as a result of the study. The initial IPSS and IIEF values were compared with the findings at 1, 3, and 6 months. Changes in these values were compared with the pre- and post-biopsy characteristics of the patients.

Statistical Analysis

Data were expressed as the mean±standard deviation, percentage (%), and median (minimum-maximum). The distribution of the variables was measured by the Kolmogorov-Smirnov test. The Mann-Whitney U test was used to analyze the quantitative data. The Chi-squared test was used to analyze the qualitative data. Data were analyzed using the Statistical Package for the Social Sciences version 21.0 program (IBM Corp., Armonk, NY, USA) for statistical analysis. A $p<0.05$ was accepted as statistically significant.

RESULTS

The study included 189 patients who underwent prostate biopsy matching the criteria. Twenty-two patients diagnosed with prostate cancer via biopsy, 10 patients with re-biopsy indications, and 31 patients who were not able to attend follow-ups were excluded from the study. The mean age of the remaining 126 patients was 65±2.56. The mean PSA of the patients before the biopsy was 8.1±0.84 ng/mL, the IIEF score was 23.49±2.14, the IPSS value was 10.2±0.95, and the PV was 55±4.3 cc. The mean VAS questioned during the procedure was calculated to be 3.28±0.46 (Table 1).

The mean IIEF score of the patients at the 1st month follow-up was 19.03±1.8, 22.1±2.1 at the 3rd month, and 22.5±2.08 at the 6th month. There was a statistically significant decrease in the 1st month IIEF compared to the baseline ($p=0.023$). No significant difference was observed in the IIEF scores after 3 and 6 months compared to the beginning ($p>0.05$). While the rate of non-ED patients was 61.1% at the beginning, this rate decreased to 25.3% at the 1st month, and it was statistically significant ($p<0.05$) (Table 2). There was a statistically significant increase in mild ED, mild-to-moderate ED, and moderate ED rates at the 1st month compared to the baseline ($p<0.05$), but no significant difference was found in a severe ED ratio ($p=0.85$) (Table 2).

There was a statistically significant difference in the ratio of mild-to-moderate ED (23% vs. 11.1%) after 3 months ($p<0.05$). No significant difference was observed after 6 months compared to the baseline (Table 2).

In terms of voiding symptoms, the IPSS mean value after 1 month was 13.4±2.4, 11.4±1.9 after 3 months, and 12.1±1.8 after 6 months; furthermore, there was no significant difference according to the initial IPSS values ($p>0.05$).

Considering the IIEF score in the 1st month and factors affecting the deterioration in the ED degree, there was no statistically significant difference in the IPSS, PSA, PV, age, and biopsy scores ($p>0.05$) (Table 3).

After a TRUS biopsy, an acute urinary retention developed in 3 patients (2.3%), and a febrile urinary tract infection developed in 4 patients (3.1%). Patients with febrile urinary tract infections were hospitalized and treated with iv antibiotics. Forty-two (33%) patients complained of hematuria, and 28 (22%) patients complained of hematospermia. IIEF The IIEF mean scores in complicated patients (58/46%) at the 1st month were significantly lower than those without complications ($p=0.038$) (Table 3). The mean IIEF score reduction in the patients who developed complications (5.4±0.68) was found to be significantly higher than in those without complications (1.95±0.43; $p=0.018$) (Table 4).

Table 1. Characteristics of patients who underwent a trus biopsy

Characteristic	Mean Value
Age (year)	65.5±2.56
PSA (ng/mL)	8.1±0.84
IIEF-5 score	23.49±2.14
IPSS value	10.2±0.95
Prostate volume (m^3)	55±4.3 cc

PSA: prostate specific antigen; IIEF: index of international erectile function; IPSS: international prostate symptom score

DISCUSSION

Complications such as hematuria, hematospermia, a urinary tract infection, and acute urinary retention may develop after a TRUS biopsy. Especially infectious complications may show a febrile progress and may require hospitalization (3, 5). Other than these, voiding difficulty, ED, and impaired QoL can also be seen after a TRUS biopsy (4). In our study, urinary retention developed in 2.3%, febrile urinary tract infection in 3.1%, hematospermia in 22%, and hematuria in 33% of patients. In complicated cases, the 1st month IIEF and ED values deteriorated ($p<0.05$), but no statistically significant alteration in the 3rd and 6th month values were detected compared to the baseline ($p>0.05$). ED is an important problem affecting patients' quality of life. The importance of erectile function loss increases when the psychosocial status of a patient in the diagnostic research stage with the suspicion of prostate cancer is considered. In this study, we aimed to minimize the psychogenic ED factor by not including patients who were diagnosed with prostate cancer, who had a biopsy before, and who would be re-biopsied.

Although there are studies indicating that there is no statistically significant increase in the rate of ED after prostate biopsy, there have been many articles published saying the opposite (6-8). ED occurs early after a TRUS biopsy and often heals over time (9).

Table 2. Evaluation of sexual and voiding functions of the patients at the 1st, 3rd, and 6th month follow-up in comparison with the baseline

	Baseline	1st month	3rd month	6th month
IIEF-5	23.49±2.14	19.03±1.8 (0.023)	22.1±2.1 (p>0.05)	22.5±2.08 (p>0.05)
Normal	61.1%	25.3% (0.025)	61.1% (p>0.05)	55% (pp>0.05)
Mild ED	7.9%	14.3% (0.029)	10.3% (p>0.05)	8.7% (p>0.05)
Mild-to-Moderate ED	11.1%	17.4% (0.032)	12.1% (p>0.05)	15% (p>0.05)
Moderate ED	15.9%	38.1% (0.018)	10.3% (p>0.05)	15% (p>0.05)
Severe ED	4%	4.8% (p>0.05)	5.5% (p>0.05)	6.3% (>0.05)
IPSS	10.2±0.95	13.4±2.4 (p=0.039)	11.4±1.9 (p>0.05)	12.1±1.8 (p>0.05)

IIEF: index of international erectile function; PSA: prostate specific antigen; ED: erectile dysfunction

Table 3. Comparison of demographic characteristics and complications of the patients with deterioration of the erectile function in the 1st month

	ED Grade Stabile (n=56)	ED Grade Deteriorated (n=70)	p
PSA (ng/mL)	7.28±2.45	8.43±1.65	>0.05
PV (cc)	57±2.3	53.6±3.8	>0.05
IPSS	10.3±0.51	10.1±0.45	>0.05
VAS	2.95±0.22	3.34±0.15	>0.05
Complication (+) (%) (n=58)	28 (n=16)	66 (n=42)	0.004
Complication (-) (%) (n=68)	72 (n=40)	34 (n=28)	

PSA: prostate specific antigen; IPSS: international prostate symptom score; VAS: visual analogue scale; PV: prostate volume

Table 4. The 1st month IIEF evaluation of patients who developed complications after prostate biopsy

	Mean IIEF in 1st Month	Mean Decrease in IIEF
Complication (+) (%) (n=58)	16.3 ±0.3	5.4±0.68
Complication (-) (%) (n=68)	19.4±0.5	1.95±0.43
p	0.038	0.018

The other prospective studies did not support the opinion that the periprostatic nerve block causes loss of erectile function due to hematoma and edema in the neurovascular bundle (4, 8, 9). Another study reported that lower pain scores had no effect on erectile function changes (10). In our study, transrectal 2% lidocaine gel massage was performed as an anesthesia method, and no significant relationship was found between the VAS grade and the IIEF-5 score change (p>0.05). In addition, there was no significant relationship between VAS and worsening in the ED severity (mild, mild to moderate, moderate, severe).

In previous studies, an age greater than 60 years, a history of biopsy with diagnosed prostate cancer, an active follow-up, and the number of cores taken at biopsy were reported to increase the ED risk (8, 11-13). In our results, there was no significant difference with regard to the ED risk in patients younger or older than 60 years.

According to the results of our study, there was a significant change in the ED category (no ED, mild ED, mild-to-moderate ED, moderate ED) and the IIEF-5 score at the 1st month follow-up after biopsy (p<0.05). This change was not seen in further follow-ups, and it returned to pre-biopsy values at the 6th month follow-up. The rate of deterioration of ED in patients before the biopsy was 57% in non-ED; 90% in mild ED, 92% in mild-to-moderate; 12% in medium ED; and 0% in severe ED. Patients from the mild ED and mild-to-moderate ED groups showed statistically significant differences (P=0.004, P=0.003). In our study, it was shown, similar to the literature, that the initial values of PV, PSA, and IPSS had no effect on the ED rates and IIEF scores after a TRUS biopsy (p>0.05). The findings that we could not detect in the literature are the change in the ED rates in patients with complications related to the biopsy (8, 12). At the 1st month follow-up, the IIEF score (17.8 ±0.9 vs. 21.95±0.68; p=0.038) and ED values (mild ED, mild-to-moderate ED, moderate ED, severe ED; p=0.026) were statistically significantly worse in patients who had complications (hematuria, hematospermia, urinary retention, and urinary tract infection) (58/46%) than in patients who did not have complications (68%/54%). These results can be both of the organic and psychological origin. We think that the development of ED is due to the psychological effects caused by complications such as hematoma, edema of the regional anatomy, and teasing symptoms such as hematuria and hematospermia. All of these symptoms were observed within the first month and not after. In addition, erectile functions of the patients started to improve after the 1st month and returned to their previous levels before the 6th month.

The negative aspects of our study were that the patients were not selected from patients without ED, and the TRUS biopsy was not performed by the same urologist. We think that biopsies made by physicians from various groups may have an effect on the erectile function and complication rates.

CONCLUSION

In patients undergoing a TRUS biopsy, ED may be observed, especially in the early months following the biopsy. However, ED

fully resolves within 6 months. The loss of erectile function was significantly higher in patients who developed complications such as hematuria, hematospermia, a urinary tract infection, and acute urinary retention.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed consent was obtained from patients who participated in this study.

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