

An Observational Study on the Effect of Sextant TRUS-Guided Biopsy on Erectile Function

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What's known on the subject? and What does the study add?

The literature on erectile dysfunction after prostate biopsy is variable. In some studies, erectile dysfunction was observed after the biopsy, but this effect resolved after 3 or 6 months. In our study, there was no difference in IIEF scores before and after the biopsy; only patients with prostate cancer had significantly higher erectile dysfunction.

Abstract

Objective: Many complications after prostate biopsy (PB) have been reported. One of the possible complication after PB is erectile dysfunction (ED). In this study, we showed the early (1 month after PB) effect of PB on erectile function.

Materials and Methods: A total of 207 men who underwent PB between April 2021 and October 2021 were evaluated. Before and 1 month after PB, all patients were evaluated with the IIEF-5 (5-item version of the International Index of Erectile Function) prospectively. Patient data such as age, body mass index, prostate-specific antigen levels, prostate volume, periprostatic local anesthesia, pathological results, and post-biopsy complications were noted.

Results: The mean IIEF-5 score was 13.3 (5-25) before PB. One month after the biopsy it was 13.5 (5-25). There were no differences between the before and after PB IIEF scores. The only significant change was observed in the prostate cancer (PCa) group.

Conclusion: In past studies, it has been shown that ED after prostate biopsy is mostly seen at the first month and improves after that. In our study, PB did not affect erectile function. Only the PCa-diagnosed group showed a significant decrease in erectile function, and this effect was not attributed to prostate biopsy.

Keywords: Sextant prostate biopsy, erectile dysfunction, prostate cancer

Introduction

Transrectal ultrasound-guided sextant prostate needle biopsy (PB) is still the most commonly used procedure for the diagnosis of prostate cancer (PCa) (1). Frequent complications following this procedure include hematuria, rectal bleeding, hematospermia, urinary tract infection and rectal discomfort. More severe complications, such as urinary retention, serious infection, and sepsis, are comparatively rare (2).

Various studies have suggested that PB is associated with erectile dysfunction (ED). These effects have been associated

with several factors such as anxiety related to the biopsy (3), periprostatic nerve block (PNB), neurovascular bundle injury (4,5), the number of biopsy cores taken (6), and the type of the biopsy (either transperineal or transrectal). By contrast, some studies did not find a relationship between PB and ED (7). In addition, the diagnosis of PCa may cause ED because of psychological stress, anxiety, and depression (8).

The literature on ED after prostate biopsy is variable. In some studies, a significant decrease was observed in IIEF scores 1 month after biopsy, but this effect resolved with non-significant differences at 3 and 6 months after PB (9). Therefore, there is a need to better understand the association between PB and ED.

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Received: 26.07.2023 **Accepted:** 31.03.2024

Cite this article as: Yaytokgil M, Başer A. An Observational Study on the Effect of Sextant TRUS-Guided Biopsy on Erectile Function. J Urol Surg. 2024;11(3):140-144.

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Our study investigated the incidence of early (1 month after PB) ED after PB and possible contributing factors.

Materials and Methods

A total of 207 men who underwent PB between April 2021 and October 2021 were prospectively evaluated. Patients with prior prostate biopsy history, different pathologies of the specimen [Prostatic intraepithelial neoplasia (PIN), urothelial cancer and Atypical small acinar proliferation suspicious (ASAP)], and ED treatment history were excluded from the study. Elevated prostate-specific antigen (PSA) levels (>2.5 ng/mL) and/or abnormal digital rectal examination (DRE) (nodule, stiffness) were indications for PB. Written informed consent was obtained from all patients. The research was approved by the Ethics Committee of Hitit University Faculty of Medicine (protocol number: 447-07/04/2021, date: 29.03.2021).

Second-generation cephalosporin sefpodoksim proksetil 200 mg and ornidazole 500 mg (twice a day) were started 2 days before the procedure. Ten milliliters of 2% lidocaine was instilled into the rectum 15 minutes before the procedure to obtain local anesthesia. We used a disposable biopsy device and a disposable 18-gauge 20 cm biopsy needle, which were all compatible with transrectal ultrasound (Geotek healthcare products TRUS Biopsy Kit-CE1984). We performed 12 core-sextant biopsy with additional cores from the suspected areas. Before the biopsy, PNB made to 134 patients with 2% prilocaine-HCl 5 cc on each side of the prostate by 18-gauge Chiba needle. Prostate volume was calculated using the ellipsoid formula (volume = height × length × width × 0.53).

Before PB and 1 month after PB, all patients were evaluated with the IIEF-5 (5-item version of the International Index of Erectile Function) prospectively. The IIEF-5 questionnaire is a shortened version of the IIEF-15, which is the final item of sexual intercourse satisfaction. In this study, we used the Turkish version of the IIEF-5 validated by Turunc et al. (10) in 2007. We categorized the severity of ED into five groups according to IIEF-5 scores; severe (5-7), moderate (8-11), mild to moderate (12-16), mild (17-21), and no ED (22-25). These 207 patients were divided into three groups according to the change in their total IIEF scores after one month. These groups determined with increase, decrease and no change in IIEF scores. We compared the datas [age, BMI (body mass index), PSA levels, prostate volume, periprostatic local anesthesia, pathologic results, post-biopsy complications] of these three groups. Postoperative complications were noted according to modified Clavien-Dindo classification system. Visual analog scale (VAS) questionnaire was directed to all patients after biopsy.

Statistical Analysis

IBM SPSS Statistics V22.0 was used for statistical analysis. The normal distribution of data was tested by the Kolmogorov-Smirnov, Shapiro-Wilk test. The Mann-Whitney U test was used for those who did not show normal distribution, and the Student's t-test was used for comparison of normally distributed data. The IIEF-5 score changes were compared using the paired t-test. Statistical significance was considered when the p-value was less than 0.001.

Results

A total of 207 patients were included in the study. The mean age of the patients was 64.7 (50-77) years, and the mean BMI was 27.6 (17.9-40.1). The mean serum PSA level was 14.9 (2.9-120) ng/mL and the mean prostate volume was 52.3 (10-140) cc. Forty-six (22.2%) patients had abnormal DRE findings. Mean VAS scores was 2.4 (0-8) (Table 1).

There were no serious complications during the procedures. According to the Clavien-Dindo classification system, grade-I complications developed in 43 patients and grade II complications in 12 patients after the procedure. There were no grade III or IV complications (Table 2).

The mean IIEF-5 score was 13.3 (5-25) before TRUS-Bx. One month after biopsy it was 13.5 (5-25). When prior to PB and after PB IIEF scores were compared, we found that 113 scores did not change, 44 scores increased, and 50 scores decreased. With

Characteristic	Value (n)
Age* (years)	64.7 (±6.62)
BMI* (kg/m ²)	27.6 (±3.87)
Abnormal DRE, n (%)	22.2 (46/207)
Serum PSA* (ng/mL)	14.9 (±21.1)
VAS scores*	2.4 (±1.77)
Prostate volume* (mL)	52.37 (±23.1)
Prior IIEF-5 score*	13.34 (±5.97)

*Mean ± standard deviation
 BMI: Body mass index, DRE: Digital rectal examination, PSA: Prostate-specific antigen, ED: Erectile dysfunction, IIEF: International Index of Erectile Function, VAS: Visual analog scale

Grade I [n=43]	Grade II [n= 12]
Fever (n=8)	Urinary tract infection (n=10)
Rectal pain (n=10)	Anemia (n=2)
Urinary retention (n=4)	
Hematuria (n=15)	
Erectile dysfunction (n=6)	

PB: Prostate biopsy, Grade IIIa, Grade IIIb, Grade IV not seen

these results we divided patients into 3 groups. In this group, age, PSA level, prostate volume, VAS scores, and complication rates were similar. PNB was performed in 134 patients (64.7%). There was no significant difference in the IIEF change. Between these groups, only the PCa ratio was statistically different (Table 3).

Sixty-five of 207 biopsies resulted in PCa (31.4%). Fifty-two (80%) of these had ED before PB. After 1 month, the number of ED patients increased to 56 (86.1%). When classified mild, mild to moderate, moderate and severe; pre-biopsy IIEF's were 19 (29.2%), 16 (24.6%), 13 (20%), 4 (6.1%) and post-biopsy IIEF's were 19 (29.2%), 18 (27.6%), 15 (23%) and 5 (7.6%) respectively (Table 4).

Before biopsy, ED was reported in 154 patients (74.3%) and 160 (77.2%) patients after PB. When IIEF was classified as mild, mild to moderate, moderate, and severe ED pre-biopsy, 56 (28.8%), 51 (24.6%), 41 (19.7%) and 6 (2.8%) patients, respectively. ED was reported as mild, mild to moderate, moderate, and severe in 56 (27%), 55 (26.6%), 42 (20.2%), and 7 (3.3%) patients, respectively, after 1 month (Table 4) (11).

	Pre-biopsy	1 month after	p-value
Mean IIEF	13.3	13.5	0.512
ED -	53	47	0.223
ED+	154	160	0.189
Mild	56	56	0.825
Mild-moderate	51	55	0.423
Moderate	41	42	0.321
Severe	6	7	0.612

IIEF: International Index of Erectile Function, ED: Erectile dysfunction, PB: Prostate biopsy

Discussion

PB is one of the most common urological procedures worldwide (2). ED is a common age-related medical problem that influences the quality of life and it has been reported following PB (12). The literature on ED after PB is heterogeneous, but this effect may be transient. In a systematic review in 2020, Frainberg et al. (9) found that 1 month after biopsy, the mean IIEF-5 scores had a statistically significant decrease, which appeared to resolve at 3 months. Most studies in the literature showed similar results, and we researched IIEF changes in the early period (first month) after biopsy in our study. In contrast, we did not find any association with ED after prostate biopsy in the early period. The mean IIEF-5 score was 13.3 (5-25) before TRUS-Bx in our study, after one month it was 13.5 (5-25) and this change was not statistically significant.

Chrisofos et al. (7) found a mean IIEF score of 15.9 prior to biopsy and 14.3 after 1 month biopsy. They mentioned that pre-biopsy ED had 38 patients, 18 mild, 9 mild- moderate, 7 moderate, and 4 severe. One month after PB, ED was reported by 42 patients (91.30%): Twelve patients with mild ED (26.08%), 14 patients with mild to moderate ED (30.43%), 9 patients with moderate ED (19.56%), and seven patients with severe ED (15.21%) (7). Kamali et al. (13) found a pre-biopsy ED rate of 76.2%, and these patients had 23 mild (28.8%), mild-moderate 21 (26.3%), moderate 17 (21.3%), and severe 0. Respectively, after 1 month, the ED subtypes were 23 (28.8%), 19 (23.8%), 18 (22.5%), and 5 (5%) patients. The mean IIEF before PB was 16.5 after 1 month 15,7 (13). Both authors found that the changes in IIEFs were not significant. In our study, similar to the mean IIEF score, the severity of ED did not change after PB. Before biopsy, ED was reported in 154 patients (74.3%) and 160 (77.2%) patients after PB. When IIEF was classified as mild, mild to moderate,

		Group 1 (raised IIEF) n=44	Group 2 (decreased IIEF) n=50	Group 3 (no change) n=113	p-value
Age (years) *		64.50 (7)	67.0 (15.75)	65 (9.75)	0.288
BMI (kg/m ²) *		27.85 (3.43)	27.84 (6.18)	26.81 (6.83)	0.836
PSA (ng/dL) *		7.40 (3.48)	7.35 (21.12)	7.05 (5.02)	0.328
Prostate volume (mL) *		50 (24)	50 (20)	50 (38)	0.578
VAS score		2 (2)	2 (3)	2 (2)	0.457
PNB	+n (%)	32 (72.7)	33 (66.0)	69 (61.1)	0.380
	-n (%)	12 (27.3)	17 (34.0)	44 (39.9)	
PCa	-n (%)	36 (81.8)	24 (48.0)	82 (72.6)	0.001
	+n (%)	8 (18.2)	26 (52.0)	31 (27.4)	
Complication grade II or higher	-n (%)	40 (90.9)	48 (96.0)	107 (97.4)	0.544
	+n (%)	4 (9.1)	2 (4.0)	6 (5.3)	

*Mean ± standard deviation
BMI: Body mass index, PSA: Prostate-specific antigen, IIEF: International Index of Erectile Function, VAS: Visual analog scale, PNB: Periprostatic nerve block, PCa: Prostate cancer

and moderate ED pre-biopsy, 56 (28.8%), 51 (24.6%), 41 (19.7%) and 6 (2.8%) patients, respectively. ED was reported as mild, mild to moderate, moderate, and severe in 56 (27%), 55 (26.6%), 42 (20.2%), and 7 (3.3%) patients, respectively, after 1 month. No statistically significant difference was found in our study either (Table 3).

ED can occur more often after PB in PCa diagnosed patients. Helfand et al. (14) found that in 134 men evaluated after PB, PCa-diagnosed patients had an increased rate of ED as checked against men without PCa. They pointed out that men with PCa were 9.1 times more likely to have a decrease of 5 or more points in their total IIEF compared with men without cancer (14). In support of this finding, we found similar results to those of Helfand et al. (14) when pre- and post-biopsy IIEF scores were compared, 113 scores were not changed, 44 score were raised and 50 score were decreased. In these three groups, when the pathological outcomes were compared, the IIEF change was statistically significant in the PCa group (Table 4). This decrease in IIEF scores can be explained by three reasons; diagnosis of PCa, anxiety involved in the diagnosis of PCa, and possible choice of treatment for PCa (14).

The effect of PNB to erectile function is variant. Klein et al. (5) investigated whether PNB could result in ED after PB. In our study, there was no difference in terms of IIEF change between patients with and without PNB (Table 4). Klein et al. (5) reported that the decrease in IIEF-5 scores 1 month after PB recovered within 3 months. They found that ED might be associated with prostate biopsy regardless of PNB or number of cores, but that reduction was reversible within 3 months (5). In addition, we did not find any difference with PNB applied PB patients IIEF scores.

Although different rates of PCa are stated in various studies, in our study we found a PCa detection rate of 31.4% similar to that reported in the literature (65/207 biopsies). This rate ranges between 25.8% and 48% in different studies (15).

In our study, while investigating ED as a complication of prostate biopsy, we also noted and classified other complications. The complication rate of our study was 26.5% (55 of 207 biopsies), which was similar to the literature (16,17). There were modified Clavien-Dindo gradel 43 (20.7%) and 12 grade II (5.8%) complications, and we did not have any grade III or IV complications (Table 2). Prasetya and Renaldo (17) found an overall 98 complication events of 400 biopsies (24.75%), divided into 5 grades (I, II, IIIa, IIIb, and IV). Grade I was 20.5%, grade II was 3.25%, grade IIIa 0.25%, grade IIIb 0.25% and grade IV was 0.5% (16,17).

Conclusion

Various studies that aimed to show the relationship between PB and erectile function demonstrated that erectile function decreases in the early period after PB, and longer follow-up showed that these changes resolved back to baseline. In contrast, our study showed that PB did not affect erectile function 1 month after PB. However, ED is a possible complication after PB; therefore, potent patients should be informed.

Ethics

Ethics Committee Approval: The research was approved by the Ethics Committee of Hitit University Faculty of Medicine (protocol number: 447-07/04/2021, date: 29.03.2021).

Informed Consent: Written informed consent was obtained from all patients.

Authorship Contributions

Surgical and Medical Practices: M.Y., A.B., Concept: M.Y., A.B., Design: M.Y., A.B., Data Collection or Processing: M.Y., A.B., Analysis or Interpretation: M.Y., A.B., Literature Search: M.Y., A.B., Writing: M.Y., A.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declare that they have no relevant financial.

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