



Impact of Prostate Needle Biopsy on Erectile Function

Prostat İğne Biyopsisinin Erektıl Fonksiyon Üzerine Etkisi

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Abstract

Aim: To evaluate the impact of transrectal ultrasonography-guided prostate needle biopsy (TRUS-Bx) on erectile function.

Methods: Patients who underwent TRUS-Bx were prospectively examined. The indications for prostate biopsy were elevated prostate-specific antigen (PSA) level and/or abnormal digital rectal examination. All patients were evaluated with the 5-item version of the International Index of Erectile Function (IIEF-5) before TRUS-Bx and at one, three and six months after TRUS-Bx. Severity of erectile dysfunction (ED) was classified into five categories according to IIEF-5 scores.

Results: Eighty patients were included in the study. The mean age of the patients was 64.7 years and the mean serum PSA level was 10.2 ng/mL. The mean IIEF-5 score was 16.5 prior to TRUS-Bx. Before TRUS-Bx, ED was reported in 61 patients and mild, mild to moderate, and moderate ED in 23 (28.8%), 21 (26.2%), and 17 (21.2%) patients, respectively. Six months after TRUS-Bx, ED was reported as mild, mild to moderate, moderate and severe in 23 (28.8%), 21 (26.3%), 16 (20%) and one (1.3%) patients, respectively. The differences between before and after prostate biopsy were statistically insignificant ($p>0.05$).

Conclusion: TRUS-Bx does not have a permanent effect on erectile function. It seemed to be a trend toward increasing ED at 1 month and longer follow-up showed that these changes resolved back to baseline.

Keywords: Biopsy, erectile dysfunction, prostate, prostate cancer

Öz

Amaç: Transrektal ultrasonografi eşliğinde prostat iğne biyopsisinin (TRUS-Bx) erektıl fonksiyon üzerine etkisini değerlendirmektir.

Yöntemler: TRUS-Bx yapılan hastalar prospektif olarak incelendi. Prostat biyopsisi endikasyonları; yüksek veya artan prostat spesifik antijen (PSA) ve/veya anormal parmakla rektal muayene idi. Tüm hastalar TRUS-Bx öncesinde ve TRUS-Bx sonrası birinci, üçüncü ve altıncı aylarda Uluslararası Erektıl Fonksiyon indeksinin (IIEF-5) 5 maddelik versiyonu ile değerlendirildi. Erektıl disfonksiyon (ED) şiddeti, IIEF-5 skorlarına göre beş kategoriye ayrıldı.

Bulgular: Seksen hasta çalışmaya dahil edildi. Hastaların ortalama yaşı 64,7 ve ortalama serum PSA düzeyi 10,2 ng/mL idi. Ortalama IIEF-5 skoru TRUS-Bx öncesi 16,5 idi. TRUS-Bx öncesi 61 hastada ED vardı ve hafif, hafif-orta ve orta derece ED'li hasta sayısı sırasıyla 23 (%28,8), 21 (%26,2) ve 17 (%21,2) idi. TRUS-Bx'den altı ay sonra ED, sırasıyla 23 (%28,8), 21 (%26,3), 16 (%20) ve bir (%1,3) hastada hafif, hafif-orta, orta ve şiddetli olarak rapor edildi. Bu farklar istatistiksel olarak anlamsızdı ($p>0,05$).

Sonuç: TRUS-Bx'nin erektıl işlev üzerinde kalıcı bir etkisi yoktur. Birinci ayda ED'nin artması yönünde bir eğilim olsa da, uzun dönem takipte bu değişiklikler işlem öncesi değerlere geri dönmektedir.

Anahtar Sözcükler: Biyopsi, sertleşme bozukluğu, prostat, prostat kanser

Introduction

Prostate cancer is the second most commonly diagnosed cancer among males and accounts for 15% of all cancers diagnosed. An estimated 1.1 million cases were diagnosed worldwide in 2012 (1). Transrectal ultrasonography-guided prostate needle biopsy (TRUS-Bx) is the gold standard diagnostic procedure to confirm the presence of cancer in men with abnormal serum prostate-specific antigen (PSA)

and/or digital rectal examination (DRE). It is estimated that over 2 million TRUS-Bxs are carried out in the United States and Europe every year (2,3).

Prostate biopsy is well tolerated, especially when combined with local anesthesia, and the risk of major complications is low. Minor complications, such as hematuria, hematospermia, and rectal bleeding, are more common but are usually self-limited. Furthermore, infection

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and urinary retention are less common. Data on quality of life and erectile and voiding function following TRUS-Bx are inadequate and heterogeneous with respect to patient populations and erectile dysfunction (ED) classifications (2,4). Several authors have reported that transient voiding impairment might be precipitated by prostate biopsy (5,6). It is known that the likelihood of cancer leads to anxiety in the patient, which may be related to ED (7).

In this prospective study, we aimed to evaluate the impact of TRUS-Bx on erectile function.

Methods

Patients who underwent TRUS-Bx between January 2015 and January 2016 were prospectively examined. Patients with previous prostate biopsy history, pre-biopsy severe ED, no sexual intercourse during the study period, and the pathologic diagnosis of prostate cancer were excluded from the study. The indications for prostate biopsy were elevated or increasing PSA (>2.5 ng/mL) and/or abnormal DRE (stiffness, nodule). Systemic diseases associated with ED (diabetes mellitus, hypertension) were recorded. Written informed consent was obtained from all enrolled patients. The research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects".

Ciprofloxacin 500 mg (twice a day) was started day before the procedure. To achieve anesthesia, 10 mL of 2% lidocaine was instilled into the rectum 10 minutes before the procedure. We used a probe reinforced with a transrectal ultrasound with an automated spring biopsy gun and a disposable 18-gauge 20 cm biopsy needle. We performed sextant biopsy (at least six cores each lobe) with additional cores from suspected areas. Prostate volume was calculated using the ellipsoid formula (volume=length×height×width×0.53). Patients with diagnosed prostate cancer were not included in the study and therapeutic options were offered depending on age, comorbidity, and tumor stage.

All patients were prospectively evaluated with the 5-item version of the International Index of Erectile Function (IIEF-5) before TRUS-Bx and at one, three and six months after TRUS-Bx. We classified ED severity into five categories according to IIEF-5 scores; severe (5-7), moderate (8-11), mild to moderate (12-16), mild (17-21), and no ED (22-25). None of the patients received treatment (5-phosphodiesterase inhibitors, prostaglandin) to improve sexual function.

Statistical Analysis

SPSS for Windows version 20 was used for statistical analysis. The IIEF-5 scores were compared with the use of the paired t-test. Statistical significance was considered when two-tailed p-value was less than 0.05.

Table 1. Characteristics of the study population

Age* (years)	64.7±7.1
BMI* (kg/m ²)	27.4±4.8
Abnormal DRE, n (%)	19 (23.7)
Serum PSA* (ng/mL)	10.2±7.6
Concomitant ED related disease, n (%)	45 (56.2)
Prostate volume* (mL)	56.4±33.7
Prior IIEF-5 Score*	16.5±5.3
BMI: Body mass index, DRE: Digital rectal examination, PSA: Prostate specific antigen, ED: Erectile dysfunction, IIEF: International Index of Erectile Function *Mean ± standard deviation	

Results

Eighty patients without prostate cancer were included in the study. The mean age of the patients was 64.7±7.1 years and the mean serum PSA level was 10.2±7.6 ng/mL (Table 1). Of the patients, 19 (23.7%) had abnormal DRE findings. Prior to TRUS-Bx, 45 patients (56.2%) had concomitant ED-related systemic diseases (diabetes mellitus, hypertension). The mean prostate volume was 56.4±33.7 (Table 1). There was no serious complication in any case during the procedure.

The mean IIEF-5 score was 16.5±5 prior to TRUS-Bx (Table 1). Before TRUS-Bx, ED was reported in 61 patients (76.2%) and mild, mild to moderate, and moderate ED in 23 (28.8%), 21 (26.2%), and 17 (21.2%) patients, respectively. No patients reported severe ED in the study group before TRUS-Bx. ED was reported as mild, mild to moderate, moderate and severe in 23 (28.8%), 19 (23.8%), 18 (22.5%) and four (5%) patients, respectively, after one month and 23 (28.8%), 21 (26.3%), 16 (20%) and one (1.3%) patients, respectively, after six months (Table 2, Figure). As shown in Table 2, the difference in general and partial values was statistically insignificant (p>0.05).

Discussion

TRUS-Bx is one of the most common urological procedures in the world (2). Men undergoing prostate biopsy expect to experience the same quality of life, including sexual performance following procedure. ED is a highly prevalent age-related progressive medical problem that negatively affects the quality of life (8). There has been significant controversy as to whether TRUS-Bx predisposes patients to ED. In some publications, it has been reported that prostate biopsy caused short-term exacerbation of urinary symptoms and led to anxiety and transient ED (9). The IIEF is the most widely used self-report instrument for the evaluation of male sexual function (10). The IIEF-5 questionnaire includes five items of the IIEF-15, while the final item addresses sexual intercourse satisfaction. In this

Table 2. International Index of Erectile Function-5 scores of patients before and after prostate biopsy

IIEF-5 Score	Prebiopsy, n (%)	One month after biopsy, n (%)	p	Three months after biopsy, n (%)	p	Six months after biopsy, n (%)	p
Absence of ED (22-25)	19 (23.8)	16 (20)	0.10	18 (22.5)	0.33	19 (23.8)	0.32
Mild ED (17-21)	23 (28.8)	23 (28.8)	0.18	23 (28.8)	0.32	23 (28.8)	0.32
Mild to Moderate ED (12-16)	21 (26.3)	19 (23.8)	0.06	20 (25)	0.36	21 (26.3)	0.32
Moderate ED (8-11)	17 (21.3)	18 (22.5)	0.08	17 (21.3)	0.16	16 (20)	0.33
Severe ED (5-7)	0	4 (5)	0	2 (2.5)	0	1 (1.3)	0

ED: Erectile dysfunction, IIEF: International Index of Erectile Function, n: sayı

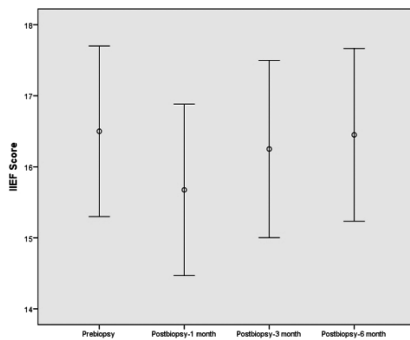


Figure 1. International Index of Erectile Function-5 scores during follow up period

IIEF: International Index of Erectile Function

study, we used the Turkish version of the IIEF-5 validated by Turunç et al. (11) in 2007. Our study had one of the longest follow-up durations in the current literature with a follow-up period of six months to evaluate long-term impact of TRUS-Bx.

The diagnosis of prostate cancer has an impact on many aspects of a man's life and may even increase stress-related events. In their prospective study of 85 patients, Helfand et al. (12) found a relationship between prostate cancer and ED. On multivariate analysis, they reported that prostate cancer diagnosis was significantly associated with a decrease in IIEF score ($p=0.001$). Therefore, in our study, patients diagnosed with prostate cancer were excluded from the study. Thus, the possibility of prostate cancer that affects the outcome of the study was disabled.

Zisman et al. (13) evaluated 211 patients and reported that preoperative anxiety was seen in 64% of patients and it was a predictive factor of intraoperative pain. Anxiety peaked before the result of pathology. The psychological concern of patients waiting for a biopsy result may lead to ED. In a study by Zisman et al. (13), ED attributed to anxiety in anticipation of biopsy was reported in 7% of cases. At days seven and 30, 15% of previously potent patients reported ED. For this reason, the evaluation of IIEF scores should be performed before TRUS-Bx to accurately define the patient's erectile function before prostate cancer diagnosis and treatment.

Repeated biopsies may be performed in men with clinical suspicion of prostate cancer due to abnormal serum PSA or DRE. With the increasing acceptance of active surveillance as a viable option for some patients with low risk prostate cancer, more men are undergoing serial TRUS-Bx. In 2009, Fujita et al. (14) analyzed 231 patients with prostate cancer on an active surveillance protocol and followed for a mean of 3.2 years. According to their results, significant correlations were found between the number of biopsies and worsening ED, with an increasing number of biopsies being associated with a decrease in the Sexual Health Inventory for Men scores. They concluded that serial prostate biopsies, especially three or more, appear to have an adverse effect on erectile function in men with prostate cancer on active surveillance. During the years between the biopsies, aging may have led to an independent deterioration of ED, therefore it is more difficult to evaluate the effect of multiple TRUS-Bxs on ED during active surveillance. Consequently, in the present study, patients who had a history of biopsy were excluded and only those who had undergone biopsy for the first time were included.

Saturation biopsies with 20 or more cores are used to evaluate patients with suspected prostate cancer who previously had negative biopsies. Akbal et al. (15) analyzed 74 prostate cancer-free patients following transrectal ultrasound-guided saturation biopsy. The new onset mild ED rate was 11.6% at the 1st month, however, no ED was reported six months after evaluation. Similar to our findings, this study suggested that a single TRUS-Bx was not associated with ED.

The precise etiology of erectile problems following prostate biopsy is unknown. It is possible that direct anatomical damage to the neurovascular bundle or hematoma/edema caused by nerve compression may lead to ED (13). Furthermore, periprostatic nerve block (PPNB) may cause transient inflammatory and neurovascular damage. PPNB provides superior analgesia during TRUS-Bx. Most protocols involve the use of lidocaine that is infiltrated into the junction between the seminal vesicles and the base of the prostate, where the neurovascular

bundles are anatomically positioned. In a prospective study, Klein et al. (16) evaluated the effect of TRUS-Bx and a PPNB on erectile function. Seventy-one patients were randomized to 10-core TRUS-Bx with PPNB and 74 were randomized to undergo 10-core TRUS-Bx with lidocaine gel only. They concluded that erectile function was transiently impaired after prostate biopsy regardless of PPNB and impairment was reversible within three months.

In 2006, Chrisofos et al. (7) examined 46 men after TRUS-Bx, and new onset ED was reported in 6.5% and 4.3% of patients at one and three months, respectively. They found no significant difference between erectile function in the 1st month and 3rd month after TRUS-Bx. In our study, the ED rate after biopsy increased compared to that before biopsy, however, the difference was not significant (prebiopsy: 76.2% vs. one month after: 80%, $p>0.05$). Additionally, ED incidence did not change at six months after biopsy (prebiopsy: 76.2% vs. after six months: 76.2%, $p>0.05$). Only one (1.3%) patient, who had moderate ED before biopsy, complained of severe ED at six-month evaluation.

Study Limitation

This study has some limitations. The first one is a relatively small sample size. Second, the clinical impact of number of cores and prostate size on our results were not evaluated. Lastly, the patients' anxiety levels were not assessed.

Conclusion

The present study showed that TRUS-Bx does not have a permanent effect on erectile function. It seemed to be a trend toward increasing ED at one month and, longer follow-up showed that these changes resolved back to baseline. Therefore, before prostate biopsy, potent patients should be informed about the temporary detriment in erectile function.

Authorship Contributions

Surgical and Medical Practices: M.S., A.A., U.Ç. Concept: F.Y., F.Ö. Design: F.Ö., Ö.S. Data Collection or Processing: A.A., U.Ç. Analysis or Interpretation: A.Ç., M.S., A.A. Literature Search: F.Y., A.Ç. Writing: F.Y., Ö.S.

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References

1. Ferlay J, Soerjomataram I, Dikshit R, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 2015;136: E359-86.
2. Loeb S, Vellekoop A, Ahmed HU, et al. Systematic review of complications of prostate biopsy. *Eur Urol* 2013;64:876-92.
3. Loeb S, Carter HB, Berndt SI, Ricker W, Schaeffer EM. Complications after prostate biopsy: data from SEER-Medicare. *J Urol* 2011;186:1830-4.
4. Rosario DJ, Lane JA, Metcalfe C, et al. Short term outcomes of prostate biopsy in men tested for cancer by prostate specific antigen: prospective evaluation within ProtecT Study. *BMJ* 2012;344:d7894.
5. Zisman A, Leibovici D, Kleinmann J, Cooper A, Siegel Y, Lindner A. The impact of prostate biopsy on patient well-being: a prospective study of voiding impairment. *J Urol* 2001;166:2242-6.
6. Bozlu M, Ulusoy E, Doruk E, et al. Voiding impairment after prostate biopsy: does tamsulosin treatment before biopsy decrease this morbidity? *Urology* 2003;62:1050-3.
7. Chrisofos M, Papatsoris AG, Dellis A, Varkarakis IM, Skolarikos A, Deliveliotis C. Can prostate biopsies affect erectile function? *Andrologia* 2006;38:79-83.
8. Feldman HA, Goldstein I, Hatzichristou DG, Krane RJ, McKinlay JB. Impotence and its medical and psychosocial correlates: results of the Massachusetts Male Aging Study. *J Urol* 1994;151:54-61.
9. Glaser AP, Novakovic K, Helfand BT. The impact of prostate biopsy on urinary symptoms, erectile function, and anxiety. *Curr Urol Rep* 2012;13:447-54.
10. Rhoden EL, Telöken C, Sogari PR, Vargas Souto CA. The use of the simplified International Index of Erectile Function (IIEF-5) as a diagnostic tool to study the prevalence of erectile dysfunction. *Int J Impot Res* 2002;14:245-50.
11. Turunç T, Deveci S, Güvel S, Peşkirioğlu L. The assessment of Turkish validation with 5 question version of International Index of Erectile Function (IIEF-5). *Türk Üroloji Dergisi* 2007;33:45-9.
12. Helfand BT, Glaser AP, Rimar K, et al. Prostate cancer diagnosis is associated with an increased risk of erectile dysfunction after prostate biopsy. *BJU Int* 2013;111:38-43.
13. Zisman A, Leibovici D, Kleinmann J, Siegel YI, Lindner A. The impact of prostate biopsy on patient well-being: a prospective study of pain, anxiety and erectile dysfunction. *J Urol* 2001;165:445-54.
14. Fujita K, Landis P, McNeil BK, Pavlovich CP. Serial prostate biopsies are associated with an increased risk of erectile dysfunction in men with prostate cancer on active surveillance. *J Urol* 2009;182:2664-9.
15. Akbal C, Türker P, Tavukçu HH, Simşek F, Türkeri L. Erectile function in prostate cancer-free patients who underwent prostate saturation biopsy. *Eur Urol* 2008;53:540-4.
16. Klein T, Palisaar RJ, Holz A, Brock M, Noldus J, Hinkel A. The impact of prostate biopsy and periprostatic nerve block on erectile and voiding function: a prospective study. *J Urol* 2010;184:1447-52.