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VOIDING IMPAIRMENT AFTER PROSTATE BIOPSY: DOES TAMSULOSIN TREATMENT BEFORE BIOPSY DECREASE THIS MORBIDITY?

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ABSTRACT

Objectives. To evaluate the association of transrectal ultrasound (TRUS)-guided prostate biopsy with voiding impairment and to investigate whether tamsulosin treatment given before prostate biopsy could improve voiding impairment after the procedure.

Methods. The study included 66 consecutive patients who underwent TRUS-guided 12-core prostate biopsy and were prospectively randomized. Of the patients, 33 were treated with tamsulosin (0.4 mg daily) beginning the day before the biopsy procedure for 30 days. The remaining 33 patients underwent TRUS-guided prostate biopsy only with no tamsulosin treatment and served as the control group. The International Prostate Symptom Score (IPSS) and maximal flow rate (Qmax) were recorded in all patients before the procedure and on postbiopsy days 7 and 30. All patients were followed up and questioned about difficulty voiding and acute urinary retention after the procedure.

Results. No difference was found in the mean IPSS and Qmax before biopsy between the two groups ($P > 0.05$). Acute urinary retention after the biopsy procedure developed in 1 patient in the tamsulosin group and 3 patients in the control group. The rate of voiding difficulty on postprocedure day 7 was significantly lower in the tamsulosin group (9.09%) than in the control group (42.42%), a statistically significant difference ($P < 0.001$). In the tamsulosin group, the IPSS was significantly decreased on postbiopsy days 7 and 30 compared with the baseline value ($P < 0.05$ and $P < 0.001$, respectively), and Qmax was significantly elevated on postbiopsy day 30 ($P < 0.01$). In the control group, the IPSS was significantly greater ($P < 0.05$) and the Qmax was significantly lower ($P < 0.001$) on postbiopsy day 7 compared with the baseline value.

Conclusions. The results of our study show that TRUS-guided prostate biopsy leads to transient voiding impairment, and therefore, the alpha$_1$-blocker tamsulosin before biopsy and for a brief interval afterward may decrease this morbidity. UROLOGY **62:** 1050–1053, 2003. © 2003 Elsevier Inc.

Transrectal ultrasound (TRUS)-guided biopsy of the prostate is the standard procedure for diagnosing prostate cancer. Although it is considered safe and is commonly performed on an outpatient basis, this procedure has minor complications such as pain, hematuria, hematospermia, rectal bleeding, anxiety, and acute erectile dysfunction.[1,2] Recent studies have shown that TRUS-guided biopsy of the prostate may have an impact on voiding, and a considerable number of patients have difficult voiding and/or acute urinary retention (AUR) after the procedure.[2–5] The exact mechanism of the biopsy-related voiding impairment has not been clearly defined. However, it has been shown that instrumental trauma to the prostate gland can cause an increase in bladder outlet resistance and voiding difficulty and/or AUR.[3,5]

In this study, we evaluated the association of TRUS-guided prostate biopsy with voiding impairment. We also investigated whether tamsulosin had a beneficial effect on voiding impairment after the biopsy procedure.

MATERIAL AND METHODS

Between May 2001 and February 2002, 66 consecutive men undergoing TRUS-guided prostate biopsy were prospectively

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randomized to either tamsulosin or control. Of these, 33 patients received tamsulosin, 0.4 mg once daily, the day before the procedure and for 30 days afterward. The remainder underwent TRUS-guided prostate biopsy only with no tamsulosin treatment and served as the control group. The institutional ethical committee approved this study, and all study participants read and signed an informed consent form.

The indications for prostate biopsy were abnormal digital rectal examination findings and/or elevated serum prostate-specific antigen (PSA) level (greater than 4 ng/mL). Patients were excluded from the study if they had a history of prior TRUS-guided prostate biopsy, AUR, medical or surgical treatment of benign prostatic hyperplasia, systemic disorders, including diabetes mellitus and neurologic disease, or bleeding diathesis, were currently receiving anticoagulation therapy, or were suspected of having a urinary tract infection.

The participants received prophylactic oral ciprofloxacin 500 mg the night before and the morning of the biopsy, followed by 500 mg orally twice daily for 2 days. A Fleets enema was self-administered the night before the procedure. Prostate biopsy was performed in the left lateral decubitus position using a 7.5-MHz transrectal probe (Siemens Sonoline, Erlangen, Germany). All patients received 10 mL of 1% lidocaine injected into the periprostatic nerve plexus under ultrasound guidance.[6] A total of 12 biopsies were taken in all patients using an automatic spring-loaded 18-gauge needle.

The validated International Prostate Symptom Score (IPSS) and quality-of-life question suggested as the bother index of the IPSS,[7,8] the postvoid residual urine volume, and the maximal flow rate (Qmax) were recorded for all patients before the procedure. In addition to these parameters, the patients were followed up and questioned for the presence of voiding impairment, including difficulty voiding and AUR, on postbiopsy days 7 and 30. Difficulty voiding was defined as the new onset or worsening of subjective complaints. It was assessed using a self-administered verbal rating scale (grading 0 to 5; 0, no voiding difficulty; 1 to 2, mild; 3, moderate; and 4 to 5, severe). The IPSS, quality-of-life score, and Qmax before and after biopsy were compared in the patients who did not have AUR.

All data are expressed as the mean ± standard deviation. Statistical analyses were done using Pearson's chi-square test to compare the proportions, the paired *t* test to compare the values before and after the biopsy, and the Mann-Whitney *U* test to compare the values between the two groups. A *P* value less than 0.05 was considered statistically significant.

RESULTS

No statistically significant differences were found between the tamsulosin and control groups with regard to the baseline characteristics (Table I). Fourteen men (42.42%) in the control group and 3 (9.09%) in the tamsulosin group had voiding difficulty on postprocedure day 7 ($P < 0.001$; Fig. 1). Of these, 2 men (6.06%) in the control group reported severe voiding difficulty but no patient did so in the tamsulosin group. On postprocedure day 30, 8 men (24.24%), all in the control group, reported subjective voiding difficulty.

AUR developed in 3 patients (9.09%) in the control group and 1 patient (3.03%) in the tamsulosin group on postprocedure days 2 to 4 (2.75 ± 0.95). No clot retention was noted (Fig. 1). AUR was managed with catheter placement. No patient had an infectious complication.

TABLE I. *Baseline characteristics*

Characteristic	Control	Tamsulosin
Patients (n)	33	33
Age (yr)	61.46 ± 6.93	63.56 ± 7.08
PSA (ng/mL)	8.31 ± 13.76	9.56 ± 8.12
IPSS	15.71 ± 7.36	15.4 ± 6.78
QOL	3 ± 1.3	2.65 ± 1.26
Residual urine volume (mL)	42.65 ± 25.2	45.2 ± 21.52
Qmax (mL/s)	12.96 ± 5.05	12.78 ± 5.44
Prostate volume (cm^3)	42.16 ± 18.14	49.65 ± 18.12
Transition zone volume (cm^3)	21.6 ± 11.9	26.53 ± 12.37

KEY: PSA = prostate-specific antigen; IPSS = International Prostate Symptom Score; QOL = quality of life; Qmax = peak urinary flow rate.
Data presented as the mean ± SD.
P values for all factors are not statistically significant.

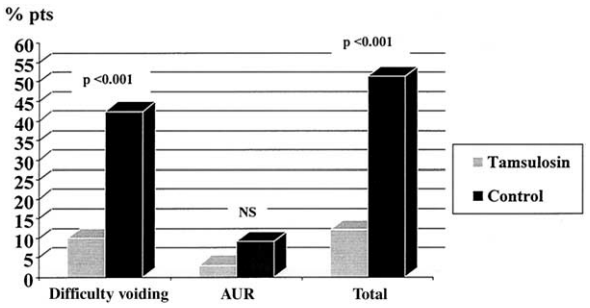

FIGURE 1. *Comparison of voiding impairment after prostate biopsy between control and tamsulosin groups. NS = not significant.*

In the control group, the baseline values of IPSS, quality-of-life score, Qmax, postvoid residual urine volume, prostate volume, and transition zone volume were not significantly different between the patients with and without voiding impairment, including voiding difficulty or AUR ($P > 0.05$). Compared with baseline values, the IPSS was significantly greater ($P < 0.05$) and the Qmax was significantly lower ($P < 0.001$) in the control group on postprocedure day 7 (Table II). According to the baseline values, the IPSS had significantly decreased on postprocedure days 7 and 30 ($P < 0.05$ and $P < 0.001$, respectively) and the Qmax was significantly elevated on postprocedure day 30 ($P < 0.01$) in the tamsulosin group (Table II). The postprocedure IPSS was significantly lower and the postprocedure Qmax was significantly higher statistically in the patients treated with tamsulosin compared with the values for the control group (Table II, $P < 0.01$). No patient had side effects resulting in discontinuance of tamsulosin.

COMMENT

TRUS-guided prostate biopsy is a safe and well-tolerated procedure for the diagnosis of prostate

TABLE II. *Comparison of prebiopsy and postbiopsy IPSS, QOL, and Qmax in patients who voided by urethra*

	Control			Tamsulosin		
		Postprocedure			Postprocedure	
Parameter	Baseline	Day 7	Day 30	Baseline	Day 7	Day 30
IPSS	15.24 ± 7.65	18.20 ± 8.24*	15.6 ± 8.13	15.12 ± 6.71	13.16 ± 6.65*	10.77 ± 6.27†
QOL	2.75 ± 1.36	3.1 ± 1.44	2.8 ± 1.15	2.61 ± 1.25	2.35 ± 0.95	1.8 ± 0.7‡
Qmax (mL/s)	13.41 ± 4.38	10.5 ± 4.89†	12.95 ± 4.5	13.03 ± 5.33	14.01 ± 4.4	15.6 ± 4.53‡

Abbreviations as in Table I.
* P *<0.05 compared with baseline.*
† P *<0.001 compared with baseline.*
‡ P *<0.01 compared with baseline.*

cancer, with few major, but frequent minor, complications.[1,2,4] In this study, we demonstrated that TRUS-guided prostate biopsy had a measurable impact on voiding whether the patients had several degrees of lower urinary tract symptoms, suggestive of benign prostatic obstruction, before the procedure. Approximately 50% of our patients reported voiding impairment after the procedure; most of them had subjective complaints of voiding and 10% had AUR.

The changes in the subjective and objective parameters of voiding after TRUS-guided biopsy cannot be explained by natural variations. However, several studies have clearly demonstrated the changes in voiding parameters after the biopsy procedure.[2–5] In published reports, the rate of difficult voiding after TRUS-guided prostate biopsy has been reported to range from 0.8% to 40%.[2–5] Additionally, a considerable number of patients have AUR after the procedure, and our findings are consistent with previously reported studies.[2,3,5] It seems likely that the AUR rate of 9% in the present study was slightly greater. We used a 12-core biopsy; however, the median number of biopsy cores was 8 in the previous studies.[2–4] Borboroglu *et al.*[5] obtained an average of 22.5 cores, and they reported that 10% of the patients had AUR. We believe that the high incidence of AUR may be explained by the biopsy technique and the number of cores sampled.

Voiding impairment after TRUS-guided prostate biopsy is not limited to AUR only. Also, a significant number of patients have reported postprocedure voiding difficulty, and a statistically significant increase in IPSS has been observed.[3] Zisman *et al.*[3] found that the overall IPSS did not differ between the baseline and postprocedure day 7 values, but did find a statistically significant difference in the baseline versus postprocedure day 7 IPSSs among patients with a preprocedure IPSS greater than 21. In the present study, we found significantly elevated overall IPSSs on postprocedure day 7 regardless of the baseline value. Although the changes in the voiding parameters after the biopsy procedure were well documented in the previous studies,[3–6] none used the urinary flow rate as an objective tool. In addition to these subjective findings, we also performed uroflowmetric studies and found that the urine flow rate was reduced after TRUS-guided prostate biopsy.

Raajmakers *et al.*[2] and Zisman *et al.*[3] evaluated predictors of biopsy-related voiding impairment, and an increased transition zone volume has been reported as a risk factor for urinary retention. However, we did not find any difference in baseline symptom intensity, urinary flow rate, postvoid residual urine volume, prostate volume, or transition zone volume between the patients with and without voiding impairment, including difficulty voiding and AUR. On the basis of our findings, it seems unlikely that a possible baseline parameter exists for predicting biopsy-related voiding impairment.

The exact mechanism of the biopsy-related voiding impairment has not been clearly defined. However, it has been shown that instrumental trauma to the prostate gland during biopsy can cause increases in bladder outlet resistance and voiding difficulty and/or AUR.[3,5] These symptoms are similar to those of patients with benign prostatic hyperplasia presenting with lower urinary tract symptoms. The successful results of the alpha$_1$-blocker, tamsulosin,[9,10] to treat lower urinary tract symptoms led us to use this treatment in the patients who underwent TRUS-guided prostate biopsy. It is possible that most of these men had mild prostatic obstruction that would benefit from alpha-blockade whether or not they had undergone prostate biopsy. In published studies, this confirmation has not been previously reported. However, to our knowledge, we are the first to demonstrate the effect of the alpha-blocker, tamsulosin, on voiding impairment related to TRUS-guided prostate biopsy. We found that the rate of patients with voiding impairment was significantly lower in the tamsulosin group than in the control group; only 3 (9.09%) of 33 men in the tamsulosin group had subjective voiding complaints on postprocedure day 7. Although most of the patients in the control

group reported moderate or severe voiding difficulty after the procedure, no patient had severe voiding difficulty in the tamsulosin group. In light of these findings, we believe that tamsulosin treatment has a beneficial effect on subjective voiding impairment related to TRUS-guided prostate biopsy. Because a very small number of patients in the tamsulosin group had voiding complaints after the procedure, we could not predict which patient characteristics would identify those who would benefit from peribiopsy tamsulosin in the present study.

Biopsy-related subjective voiding impairment is not limited to the first week. It has been demonstrated that one third of patients with voiding difficulty on postprocedure day 7 had similar complaints on postprocedure day 30.[3] In the present study, although the IPSS and Qmax reverted to prebiopsy levels by day 30 in the control group, we showed that a considerable number of men in this group reported subjective voiding difficulty on postprocedure day 30. No patient had subjective complaints in the tamsulosin group on postprocedure day 30. Seven days of tamsulosin treatment may be warranted to improve the IPSS and Qmax. However, a considerable number of patients had difficulty voiding on postprocedure day 30, and we suggest that tamsulosin treatment should be continued through postprocedure day 30.

One may anticipate that tamsulosin would improve voiding complaints in most elderly men, especially as any procedure would certainly highlight any pre-existing symptoms. However, the role of the alpha$_1$-blocker, tamsulosin, on voiding impairment related to TRUS-guided prostate biopsy has not been previously demonstrated. We showed that tamsulosin treatment improves the subjective symptoms, urinary flow rate, and the rate of urinary retention after TRUS-guided prostate biopsy, whether the patients had several degrees of lower urinary tract symptoms, suggestive of benign prostatic obstruction, before the procedure. We believe that the transient voiding impairment related to this procedure cannot be defined only by prostatic edema with resulting bladder outlet obstruction. The beneficial effect of the alpha$_1$-blocker, tamsulosin, on biopsy-related subjective and objective voiding impairments recommends its use. Either the direct effect of instrumental trauma to the prostate during TRUS-guided prostate biopsy or prostatic edema after biopsy, or the both mechanisms, may have an impact on alpha-receptor sensitivity. As the effect of the alpha-blocker, tamsulosin, on lower urinary tract symptoms, suggestive of benign prostatic obstruction, has been clearly demonstrated,[9,10] we did not add groups without biopsy in the present study. However, if groups without biopsy were included, the instrumental trauma of the prostate would have been eliminated, and it would not have been possible to evaluate the effect of tamsulosin on voiding impairment related to instrumental trauma of the prostate. The present study did not have a placebo arm, but we believe our successful results will encourage other investigators to evaluate the role of alpha-receptor antagonists on this morbidity in future studies.

CONCLUSIONS

TRUS-guided prostate biopsy leads to transient voiding impairment. We did not find any baseline parameters to predict this condition. Although the exact mechanism of this condition has not been clearly defined, we found that alpha$_1$-blocker treatment with tamsulosin before the biopsy procedure may decrease this morbidity.

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