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Original Article

Concomitant transrectal ultrasound-guided biopsy and transurethral resection of prostate in patients with urinary retention and elevated serum prostate-specific antigen levels

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Abstract

Background: There was no consensus about the management of patients with urinary retention and elevated serum prostate-specific antigen (PSA) levels. This study aimed to determine whether concomitant transrectal ultrasound (TRUS)-guided biopsy and transurethral resection of prostate (TURP) is practical in patients with urinary retention and elevated serum PSA levels.

Methods: From March 2007 to May 2015, a total of 34 patients with urinary retention and elevated PSA ($\geq$ 4 ng/mL) underwent concomitant TRUS-guided biopsy and TURP. The medical records were evaluated retrospectively, and data including PSA, prostate volume, TURP results, TRUS-guided biopsy results, length of hospitalization, and complications were collected. These patients were then compared with 40 patients with urinary retention who underwent TURP alone.

Results: The mean age of the patients was 71.6 years. The mean PSA levels were 16.9 ng/mL. Prostate cancer was detected in eight cases (23.5%): one case by TRUS-guided biopsy alone, two cases by TURP alone, and five cases by both TRUS-guided biopsy and TURP. Complications included fever in five patients (14.7%), recatheterization for urine retention in two patients (5.9%), urinary tract infection in two patients (5.9%), and *de novo* urge incontinence in seven patients (20.6%). The complication rate was not significantly increased compared with that of the patients who underwent TURP alone.

Conclusion: This study showed that concomitant TRUS-guided biopsy and TURP was safe and of possible clinical significance in urinary retention patients with elevated serum PSA.

Keywords: prostate cancer; prostate-specific antigen; transrectal ultrasound-guided biopsy; transurethral resection of prostate; urinary retention

1. Introduction

An increase in serum prostate-specific antigen (PSA) levels in patients with urinary retention has been frequently reported.[1−3] In clinical settings, it is sometimes difficult to determine the cause of PSA elevation. Routine PSA testing before transurethral resection of prostate (TURP) in these patients remains controversial. Some urologists advocate preoperative PSA testing, while others find it unnecessary and

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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even misleading.[4] In cases with PSA elevation, pre-TURP transrectal ultrasound (TRUS)-guided biopsy carries certain risks, because the biopsy may worsen the urinary retention and may result in complications. Factors influencing the decision of whether or not to perform the biopsy include the patient's age, willingness, health condition, past PSA data, past biopsy results, and the urologist's preferences. The aim of this study was to determine whether concomitant TRUS-guided biopsy and TURP was viable in patients with urinary retention and elevated serum PSA ($\geq$ 4 ng/mL).

2. Methods

We retrospectively reviewed patients referred to the urology department for urinary retention from March 2007 to May 2015. Patients older than 80 years and those with serum PSA < 4 ng/mL or PSA $\geq$ 100 ng/mL were excluded from this study. These patients were excluded because the value of prostatic biopsy in this age group was questionable, and serum PSA $\geq$ 100 ng/mL was regarded as an important indicator of metastatic disease. Patients with trauma- or drug-related bladder outlet obstruction, previous bladder or prostate malignancies, acute neurologic conditions, and urosepsis were also excluded. All patients signed an informed consent document before the operation. A total of 34 patients underwent concomitant TRUS-guided prostate biopsy and TURP. Prostate volume was measured by transrectal ultrasound (BK Medical Hawk 2102 EXL; BK Medical, Herlev, Denmark). All patients received bowel preparation with cleansing phosphate enema (Evac enema, 118 mL) the night before surgery and perioperatively were intravenously administered a prophylactic broad-spectrum antibiotic. Under spinal or general anesthesia, the patient was placed in the lithotomy position. A 12-core needle biopsy using an 18-gauge needle biopsy gun (Bard Peripheral Vascular Inc., Tempe, AZ, USA) was performed under transrectal ultrasound guidance. Routine fiberocystoscopy was performed to rule out any unexpected prostatic and bladder lesions. Bipolar TURP (PlasmaKinetic Tissue Management System; Gyrus Medical Ltd., Cardiff, UK) was carried out using the standard procedures. Oral quinolone was given for 5 days. The pathologist examined the resected prostate chips and biopsy specimens separately.

The patients' demographic data, preoperative PSA levels, prostate volume, PSA density, length of hospitalization, length of catheterization, recatheterization rate, postoperative complications, and TURP and biopsy pathological results were recorded. Results were compared to those of a separate cohort of 40 patients with prostate enlargement-related urinary retention who underwent TURP alone during the study period. In these 40 patients, PSA testing was not collected before TURP. The results were compared using an independent *t* test and Fisher's exact test. A p value < 0.05 was considered to be statistically significant.

3. Results

The mean age of the patients was 71.6 years. The mean PSA levels were 16.9 ng/mL. The mean prostate volume was 60.8 cm^3. Comparison between patients with cancer and benign prostatic hyperplasia (BPH) showed no statistically significant differences in patients' age, serum PSA levels, prostate volume, and prostate-specific antigen density (PSAD; Table 1).

Overall, prostate cancer was detected in eight cases (23.5%; Table 2); it was detected by both TRUS-guided biopsy and TURP in five cases, by TURP alone in two cases, and by biopsy alone in one case. In the case diagnosed by biopsy alone, the PSA levels were 6.66 ng/mL, adenocarcinoma was found in all 12 cores, and the Gleason score was 5 + 5. The Gleason score was 3 + 3 and 3 + 4 in the two cases detected by TURP alone.

No statistically significant differences in patient age, postoperative fever, recatheterization for urine retention, urge incontinence, urinary tract infection, bladder neck contracture, length of hospitalization, and length of catheterization were found. The cancer detection rate was significantly higher (8/34 vs. 2/40; $p = 0.023$) in the group of concomitant TRUS-guided biopsy and TURP (Table 3).

4. Discussion

Urinary retention is the main indication for surgery in approximately one fourth of male patients who undergo TURP.[5] It has been reported that urinary retention increases the serum PSA levels by up to six-fold over the normal limits.[1–3] There is no consensus regarding the standard approach to this condition. Some doctors advocate TURP alone, while others routinely perform preoperative TRUS-guided biopsy. Chen et al[6] reported simultaneous TURP and TRUS-guided biopsy to release acute urinary retention and documented a definite diagnosis. We excluded patients older than 80 years because the value of prostatic biopsy in this age group was questionable, and serum PSA $\geq$ 100 ng/mL was excluded because it was regarded as an important indicator of metastatic disease.[7,8]

The rate of incidental cancer detected by TURP was 22% before PSA testing, and decreased to 9.8% in the past two decades.[9] In our study, prostate cancer was found in eight of 34 patients (23.5%). Most of the cancers (7/8) were found in the TURP chips. However, the one case missed in the TURP chips and detected by concomitant TRUS-guided biopsy was a high-risk cancer (Gleason 5 + 5) with PSA of 6.66 ng/mL. This result stresses the importance of preoperative explanation to the patient. There were no Gleason scores higher than 8 in the TURP chips. This observation also concurs with earlier

Table 1
Comparison of patients with prostate cancer and BPH.

	All patients	Prostate cancer	BPH	*p*
No. of patients	$n = 34$	$n = 8$	$n = 26$	
Age (y)	71.6 ± 7.0	74.4 ± 7.3	70.8 ± 6.8	0.209
PSA (ng/mL)	10.9 (5.7–67.1)	12 (7.5–58.4)	10.5 (5.6–55.9)	0.653
Prostate volume (cm^3)	60.8 ± 32.0	42.3 ± 23.5	66.4 ± 32.6	0.068
PSAD	0.36 ± 0.43	0.66 ± 0.73	0.27 ± 0.23	0.177

BPH = benign prostatic hyperplasia; PSA = prostate-specific antigen; PSAD = prostate-specific antigen density.