

OCCURRENCE OF ACUTE VOIDING IMPAIRMENT AFTER PROSTATE BIOPSY AND PREDICTIVE FACTORS

Hypothesis / aims of study

Transrectal ultrasound (TRUS)-guided prostate biopsy is the gold standard for the diagnosis of prostate cancer. However, this procedure is associated with potential risks and complications including infection, bleeding, and urinary retention. Although voiding impairment after prostate biopsy has been studied at one week or one month after biopsy (1,2), there are currently no data regarding acute voiding impairment on the day of the procedure.

This study aimed to evaluate the association between TRUS-guided prostate biopsy and acute voiding impairment by comparing post-void residual urine volume (PVR) before and after biopsy. We also sought to identify factors predictive of the increase of PVR after biopsy.

Study design, materials and methods

We retrospectively reviewed the medical records of 223 patients who underwent TRUS-guided 12-core prostate biopsy at our institution between April 2014 and December 2016. Biopsies were carried out under caudal block with overnight stay in the hospital.

Data on patient characteristics and PVR before and after the biopsy were collected. Patient characteristics included age, body mass index (BMI), prostate specific antigen (PSA) and prostate volume (PV). Regular use of medications such as antidiabetic drugs, antihypertensives, antithrombotic agents, and alpha-blockers for lower urinary tract symptoms was also recorded.

Non-invasive PVR measurements were carried out by bladder ultrasonography. Post-biopsy PVR was measured at the first void after biopsy.

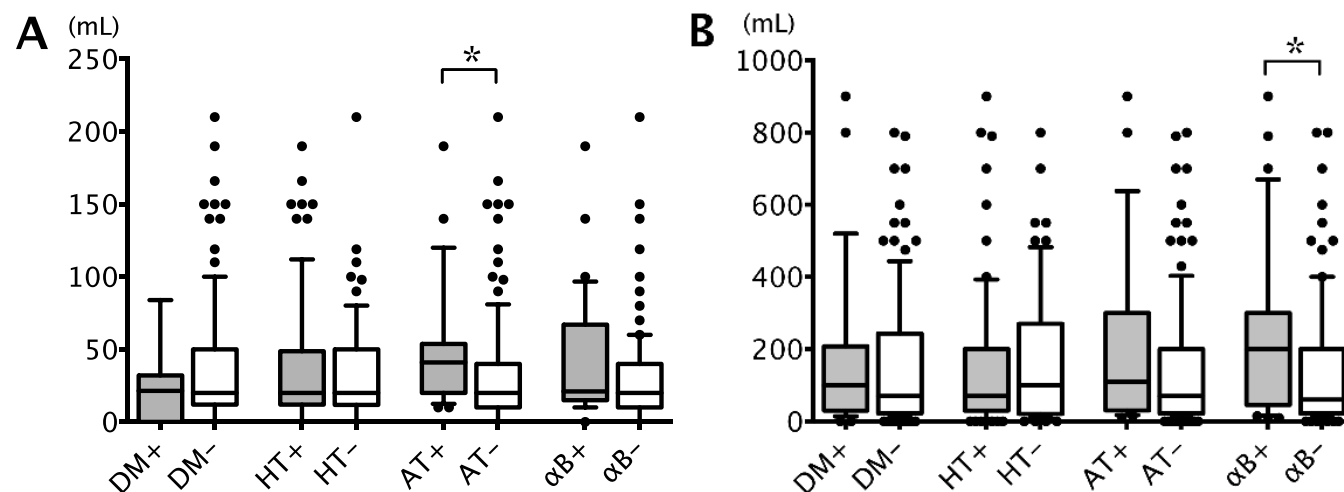
The relationships between baseline parameters and change in PVR were analyzed statistically using Spearman's correlation coefficients. Repeated measurements of variables were compared using Wilcoxon's signed rank tests, and non-parametric variables were compared using Mann-Whitney tests. Nominal data were analyzed using Fisher's exact tests. Results were considered significant at $p < 0.05$.

Table: Associations between medication use and PVR before and after prostate biopsy.

medication use	pre-biopsy PVR (mL)			post-biopsy PVR (mL)		
	yes	no	p-value	yes	no	p-value
antidiabetics	21.5	20	0.33	100	70	0.62
antihypertensives	20	20	1.0	70	100	0.69
antithrombotics	41	20	0.003	110	70	0.10
alpha-blockers	21	20	0.14	200	60	0.017

Data presented as median.

Figure: Box plots of associations between medication use and PVR before (A) and after (B) prostate biopsy. DM: antidiabetic drug use, HT: antihypertensive drug use, AT: antithrombotic drug use, aB: alpha-blocker use. *: $p < 0.05$.



Results

The median age of the patients was 69 years (interquartile range (IQR), 64 – 74), the median BMI was 23.9 kg/m² (IQR, 22.5 – 25.5), median PSA was 8.1 ng/mL (IQR, 5.7 – 12.0), median PV was 35.0 mL (IQR, 27.0 – 45.8), and 18.3%, 53.5%, 16.9%, and 25.8% of patients were taking antidiabetics, antihypertensives, antithrombotics, and alpha-blockers, respectively.

Overall, PVR increased significantly from 21 to 70 mL after biopsy ($p < 0.0001$). Post-biopsy PVR was significantly associated with pre-biopsy PVR ($p < 0.005$), but not with any other baseline variables. When compared between medication users and non-users,

patients taking antithrombotic drugs had a significantly higher PVR before biopsy, but the difference did not remain significant after biopsy (Table, Figure). In contrast, there was no significant difference in PVR of patients with or without alpha-blocker treatment, but post-biopsy PVR was significantly higher in patients receiving alpha-blockers (Table, Figure). Alpha-blocker users were significantly younger than non-users (68.5 vs 71.5 years, $p=0.009$), but there was no significant difference in other baseline characteristics between the groups.

We further investigated potentially harmful increases in PVR in patients with a pre-biopsy PVR ≤ 100 mL to see if this increased to >200 mL after biopsy. Of 206 patients with a pre-biopsy PVR ≤ 100 mL, 65 (31.6%) developed a post-biopsy PVR >200 mL, and nine (4.4%) needed temporary catheterization, before subsiding the next morning. There was no significant difference in age, BMI, PSA, or PV between patients in whom the PVR increased to >200 mL and those with no PVR increase. Among the medications used, 40.7% of alpha-blocker users had post-biopsy PVR of >200 mL, as compared with 17.2% of non-users ($p=0.0011$). No patients developed urinary retention after discharge from hospital.

Interpretation of results

PVR increased significantly after prostate biopsy and about 30% of the patients experienced a marked increase in PVR. Patient age, BMI, PSA, and PV were not associated with post-biopsy increase in PVR, but patients receiving alpha-blockers developed significantly higher PVRs after biopsy. Although starting an alpha-blocker prior to prostate biopsy has been suggested to prevent urinary retention (1), an alternative strategy should be considered for patients already taking alpha-blockers.

The effect of caudal block may need to be taken into account when interpreting these results, but that was beyond the scope of the present study. Furthermore, a previous report found no association between caudal block and increased risk of acute urinary retention, compared with periprostatic nerve block (3).

Concluding message

Acute and transient voiding impairment after TRUS-guided prostate biopsy may occur in about 30% of the patients. Regular alpha-blocker users are at increased risk of this adverse event.

References

1. Urology 62: 1050-1053, 2003
2. Urology 83: 617-621, 2014
3. Pak J Med Sci 32: 978-982, 2016

Disclosures

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