Predicting Urinary Retention After Prostate Biopsy: Evaluating Catheterization Needs Post-MRI Fusion Biopsy in Prostate Cancer Diagnosis

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Aims of study

Prostate cancer is a common malignancy, and magnetic resonance imaging (MRI)/transrectal ultrasound (TRUS) fusion biopsy provides physicians with precise information in suspected cases. This study investigates the probability of post-biopsy acute urinary retention requiring catheterization, offering valuable insights into patient care.

Materials and methods

This study involved patients who underwent MRI/TRUS fusion-guided transperineal prostate biopsy due to clinical suspicion of prostate cancer, indicated by elevated levels of prostate-specific antigen (PSA) or abnormal findings on digital rectal examination. The study also encompassed an examination of additional demographic variables, including age, anesthesia methods, tumor stage, PSA levels, prostate volume, the zones of the lesions identified on MRI, Prostate Imaging Reporting and Data System (PI-RADS) scores, the number of regions of interest (ROI) and systemic biopsies, the Gleason score determined from the MRI prostate fusion biopsy, and the occurrence of postoperative complications.

Results

In this study, a total of 222 men were included for analysis, with an average age of 64 years and a mean PSA level of 17.7 ng/mL at the time of biopsy. The average prostate volume measured 46 cm^3, resulting in a mean PSA density of 0.38. The mean PI-RADS score was 4, and the average number of biopsies was 21, including ROIs and systemic biopsies. Regarding the anesthesia method, 64 patients underwent endotracheal general anesthesia (GA), 144 received mask GA, 5 were administered intravenous GA, and 1 underwent spinal anesthesia. Only one patient had a postoperative fever, but 68 patients experienced acute urinary retention (AUR) and required catheterization. Subgroup analysis was performed among these patients, and no statistical significance was found between AUR and PSA level, prostate volume, PI-RADS score, number of biopsies, zone of lesions, or tumor stage. (Table 1)

	Non-AUR (n=150)	AUR (n=68)	
	N (%)	N (%)	*P*-value
Anesthesia			
GA	121 (79.61%)	60 (88.24%)	0.0957
MASK	26 (17.11%)	7 (10.29%)	
IVGA	5 (3.29%)	0 (0%)	
SA	0 (0%)	1 (1.47%)	
ROI lesion			
Peripheral zone	69 (45.39%)	25 (36.76%)	0.3186
Transitional	38 (25%)	20 (29.41%)	
Central	15 (9.87%)	5 (7.35%)	
Peripheral + transitional	14 (9.21%)	7 (10.29%)	
Central + transitional	2 (1.32%)	3 (4.41%)	
Peripheral + central	6 (3.95%)	5 (7.35%)	
central + transitional + peripheral	2 (1.32%)	3 (4.41%)	
Anterior margin of prostate fibromusclar stroma	1 (0.66%)	0 (0%)	
Normal	5 (3.29%)	0 (0%)	
PI-RADS			
2	6 (3.95%)	1 (1.47%)	0.2514
3	28 (18.42%)	10 (14.71%)	
4	59 (38.82%)	34 (50%)	
5	53 (34.87%)	23 (33.82%)	
Normal	6 (3.95%)	0 (0%)	
	Mean StdDev	Mean StdDev	
Age	63.83 8.21	64.44 7.77	0.6188
GS score (Target)	2.67 3.83	2.12 3.47	0.296
GS score (Systemic)	3.14 4.03	2.34 3.68	0.1513
Number of needles (Target)	21.05 4.19	21.43 5.03	0.8939
Number of needles (Systemic)	7.09 2.37	7.29 2.98	0.4339
Number of needles (Total)	13.88 2.92	14.22 3.18	0.7059
PSA level at Bx	14.71 22.08	24.73 110.73	0.2907
Prostate volume	45.52 25.06	47.33 20.98	0.3045
PSA density	0.36 0.42	0.44 1.26	0.0961

Interpretation

The analysis revealed no statistically significant correlation between the incidence of AUR and various clinical parameters such as PSA level, prostate volume, PI-RADS score, the number of biopsies, the zone of lesions, or the tumor stage. This suggests that the risk of AUR post-MRI fusion biopsy may be relatively independent of these factors, challenging the notion that certain pre-biopsy characteristics could predispose individuals to higher catheterization risks. These findings underscore the complexity of predicting AUR following prostate biopsies and suggest that factors leading to AUR may be multifactorial and not solely dependent on the clinical and procedural variables typically considered. This warrants further investigation into other potential predictors of AUR, including patient-specific factors or procedural details not captured in this study, to better identify men at risk and potentially mitigate this complication.

Conclusions

There is no significant correlation between the clinical variables we examined and the occurrence of AUR. This indicates that routine catheterization following MRI/TRUS fusion prostate biopsy may not be necessary.