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Short Communication

The Effectiveness of Multiparametrıc Prostate Magnetic Resonance Imaging in the Diagnosis of Suspected Prostate Cancer: A Cross-Sectional Analysis Compared With Other Factors

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Aim

In a tertiary diagnostic center, we aimed to compare the findings of Multiparametric Prostate Magnetic Resonance Imaging (MPMRI) obtained during a specific cross-sectional time period with prostate gland volume, patient age, PI-RADS classification, and pathology results. Our objective was to evaluate the effectiveness of mpMRI in the diagnosis of prostate cancer.

Method

We analyzed a specific cross-sectional period of Multiparametric Prostate Magnetic Resonance Imaging (mpMRI) performed at our hospital in 2024. The imaging protocol followed the current PI-RADS guidelines, including pre-contrast T2-weighted TSE axial, coronal, and sagittal sequences, T1-weighted TSE fat-saturated and non-fat-saturated axial sequences, diffusion-weighted imaging (b=50, 400, 800), ADC maps, and post-contrast T1-weighted VIBE dynamic series obtained after the administration of 10 ml of intravenous contrast. We compared data on age, prostate gland weight, PI-RADS classification for the peripheral and transitional zones, and Prostate-Specific Antigen (PSA) levels. In patients with histopathological results, we also investigated the correlation with PI-RADS classification. According to the PI-RADS classification, mpMRI provided separate grading values between 1 and 5 for the peripheral and transitional zones. Additionally, to explore the potential impact of hepatic function, we retrieved alanine aminotransferase (ALT) and aspartate aminotransferase (AST) values from the Hospital Information Management System for patients whose tests were performed within the same week as the mpMRI scans.

Results

A total of 81 patients, aged between 44 and 77 years, were included in the study. The mean age was found to be 65 years. Prostate gland volume ranged from 20 to 275 cc. Histopathological evaluation was performed on 17 of these patients. Nine patients were diagnosed with prostate adenocarcinoma, six with Benign Prostatic Hyperplasia (BPH), and two with chronic prostatitis. Among these patients, five had wall thickening in the rectum, two had chronic hepatitis, one had lung cancer, one had colon cancer, one had bladder cancer, and one had gastric cancer as comorbid conditions. Of the three patients with rectal wall thickening, two had prostate adenocarcinoma and one had chronic prostatitis. The patient with bladder cancer also had a prostate biopsy result reported as Benign Prostatic Hyperplasia (BPH). In the statistical analysis, we observed a very weak positive correlation between patient age and prostate volume. However, interestingly, no significant relationship was found between age and volume (P=0.161) (Table 1). When evaluating the relationship between PSA and volume, we found a significant positive correlation between these two entities (P<0.005) (Table 2). When examining the relationship between PI-RADS classification and prostate gland volume, no statistically significant relationship was found between PI-RADS values and volume for the peripheral zone. However, we found a significant increase in volume values as the PI-RADS score for the transitional zone increased (P=0.012) (Table 3). When evaluating the relationship between PI-RADS classification and PSA, a significant positive correlation was observed between PSA and PI-RADS scores for the transitional zone. No significant relationship was found between volume and PSA in patients with liver enzyme abnormalities. For both the peripheral and transitional zones, histopathological examination was performed in 9 out of 45 patients who were evaluated as PI-RADS 3 or higher (20%). In cases diagnosed with

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Table 1. *Prostat gland volume- age relationship*

Descriptive Statistics				
		Mean	Std. Deviation	N
age		65.32	7.106	81
volume		70.67	38.784	81
Correlations				
			Age	Volume
yaş	Pearson Correlation		1	.157
	Sig. (2-tailed)			.161
	N		81	81
volume	Pearson Correlation		.157	1
	Sig. (2-tailed)		.161	
	N		81	81

Table 2. *Prostat gland volüme- PSA relationship.*

Descriptive Statistics				
		Mean	Std. Deviation	N
volume		70.67	38.784	81
psa		9.4705	16.92961	75
Correlations				
			Age	Volume
yaş	Pearson Correlation		1	.157
	Sig. (2-tailed)			.161
	N		81	81
volume	Pearson Correlation		.555**	1
	Sig. (2-tailed)		.000	
	N		75	81

Table 3. *Relationship between prostate gland volume and Pi-RADS classification for peripheral and transitional zones.*

Descriptive Statistics				
		Mean	Std. Deviation	N
Volume		70,67	38,784	81
Peripheral zone		2,48	1,001	81
Transition zone		2,73	,866	81
Correlations				
		Volum	Peripheral zone	Transition zone
volume	Pearson Correlation	1	-.108	.279*
	Sig. (2-tailed)	.338	.012	
	N	81	81	81
Peripheral zone	Pearson Correlation	-.108	1	-.150
	Sig. (2-tailed)	.338	.181	
	N	81	81	81
Transition zone	Pearson Correlation	.279*	-.150	1
	Sig. (2-tailed)	.012	.181	
	N	81	81	81

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. *Relationship between PI-RADS classification and PSA*

Descriptive Statistics				
		Mean	Std. Deviation	N
Pi-RADS.peripheral.zon		2.48	1.001	81
PİRADS.transition		2.73	.866	81
PSA		9.4705	16.92961	75
Correlations				
		PİRADS. periferik.	PİRADS transizyonel	PSA
volume	Pearson Correlation	1	-.150	.075
	Sig. (2-tailed)		.181	.522
	N	81	81	75
Peripheral zone	Pearson Correlation	-.150	1	.279*
	Sig. (2-tailed)	.181		.015
	N	81	81	75
Transition zone	Pearson Correlation	.075	.279*	1
	Sig. (2-tailed)	.522	.015	
	N	75	75	75

*. Correlation is significant at the 0.05 level (2-tailed).

prostate adenocarcinoma, PSA values were significantly higher compared to the group without histopathological examination (P<0.05).

Discussion and Conclusion

In our study, we observed a very weak positive correlation between patient age and prostate volume. As expected, an increase in prostate volume with advancing age is a common finding in routine outpatient sonography. However, we considered the patient age group as a possible reason, as four patients were under 50 years old, and nine were under 60. The majority of the patients, 68 in total, were aged between 60 and 77 years [1]. An increase in PSA values with an increase in volume is consistent with the literature [2]. Furthermore, we found a significant relationship between prostate gland volume and PI-RADS score for the transitional zone. However, no significant relationship was observed for the peripheral zone. There was no significant relationship in terms of volume between the group that underwent biopsy and the group that did not. From this, we can infer that enlarged prostate volume may present a limitation in biopsy procedures [3]. Additionally, a significant positive

correlation was found between PSA levels and PI-RADS score for the transitional zone. These values are fundamental arguments in the diagnosis of prostate cancer [4]. The cross-sectional analysis we conducted was based on a small time frame. Larger-scale studies with broader scopes are needed.

References

1. Zhang SJ, Zhao C, Yang Q, et al. Relationship between age and prostate size. Asian J Androl. 2013;15(1):116-120.
2. Carvalhal GF, Daudi SN, Kan D, et al. Correlation between serum prostate-specific antigen and cancer volume in prostate glands of different sizes. Urology. 2010;76(5):1072-1076.
3. Volz Y, Schulz B, Stracke S, et al. The Impact of Prostate Volume on the Prostate Imaging and Reporting Data System (PI-RADS) in a Real-World Setting. Diagnostics (Basel). 2023;13(16).
4. Distler FA, Radtke JP, Bonekamp D, et al. The Value of PSA Density in Combination with PI-RADS™ for the Accuracy of Prostate Cancer Prediction. J Urol. 2017;198(3):575-582.