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Echogenicity Enhances Risk Assessment of Lesions on MP-MRI for Clinically Significant Prostate Cancer

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Introduction

- Multiparametric Magnetic Resonance Imaging (MP-MRI)/ ultrasound fusion guided biopsy (targeted biopsy) is emerging as an alternative diagnostic tool for Prostate cancer (PCa) in addition to historically used Transrectal Ultrasound-guided (TRUS) biopsy.
- Echogenicity observed during the fusion of MRI and ultrasound images may be associated with the detection of clinically significant prostate cancer in targeted biopsy of MP-MRI lesions.

Aim

To examine if the echogenicity of prostate lesions identified by MRI/US fusion can impact the risk-stratification of targeted biopsy and its ability to detect csPCa.

Methods

- A retrospective observational study was performed on patients who underwent both **standard extended-sextant 12-core biopsy** (random) and **MP-MRI/US fusion guided** (target) biopsy
- PCa lesions during target biopsy were characterized as **strongly, weakly, or not hypoechoic**. Clinically significant PCa (**csPCa**) was defined as a **Gleason score ≥ 7** and intermediate was defined as a **Gleason score = 6**.
- Lesion Data, which included **PIRADS Score**, **Gleason Grade,** and **PSA density**, was analyzed for echogenicity
- **Chi-square** was employed to test for statistical significance between groups (p-value <.05)

Figure 1

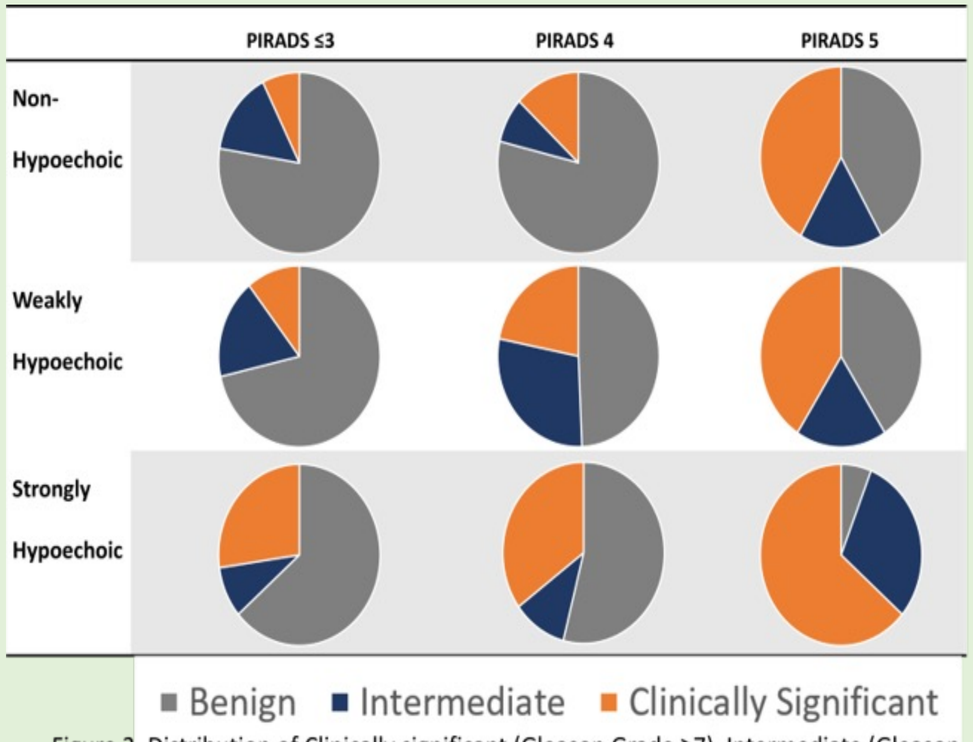

Figure 2. Distribution of Clinically significant (Gleason Grade ≥7), Intermediate (Gleason Grade = 6), and Benign lesions of prostate cancer detected by MP MRI/US guided Biopsy

Clinico-Demographics

Demographics		
Race	White	114 (51.3%)
	African American	81 (36.5%)
	Other	7 (3.1%)
	Not Available	19 (9%)
Average Age (years)	64.2 y	-
Prior Biopsy	Yes	No
	175 (78.8%)	47 (21.2%)

Lesion Characteristics		
Echogenicity	Non-Hypoechoic	219 (51.1%)
	Weakly	128 (29.8%)
	Strongly	82 (19.1%)
Gleason Grade	Benign	256 (60.9%)
	6	70 (16.6%)
	7	70 (16.6%)
	≥8	24 (5.7%)
PIRADS Score	≤3	144 (34.3)
	4	204 (48.9%)
	5	65 (15.5%)
	Not Available	7 (1.7%)

Results

- Among a total of 221 patients who underwent biopsy, 131 were diagnosed with PCa, 89 of which had csPCa. Among the total of 429 total lesions:
- 82 lesions were considered **strongly** hypoechoic, **45%** of which were **csPCa**
- 128 lesions were considered **weakly** hypoechoic, **25%** of which were **csPCa**
- 219 lesions were considered **non-hypoechoic**, **12%** of which were **csPCa**
- Within **PIRADS ≤3,** echogenicity was able to enrich the detection of csPCa from **7%** (**non-hypoechoic**) to **27%** (**strongly** hypoechoic).
- Within **PIRADS 4** echogenicity increased detection of csPCa from **13.1%** to **35.1%.**
- Within **PIRAD 5,** echogenicity enriched detection of csPCa from **42%** to **64%.**

Conclusion

- The echogenicity of the lesion detected on US at the time of prostate biopsy is complementary to PIRADS for the diagnosis of csPCa.
- A lesion that is strongly hypoechoic, despite a low PIRADS score, still carries a significant risk for csPCa and biopsy should be considered.
- Echogenicity can be used by clinicians for cancer risk stratification and aid in their decision-making process during biopsy.

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