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Negative Predictive Value of Prostate MRI in Real World Practice: Results from a Statewide Surgical Collaborative

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INTRODUCTION AND OBJECTIVE: The negative predictive value (NPV) for multi-parametric prostate magnetic resonance imaging (mpMRI) in the detection of clinically significant prostate cancer (csPCa) approaches 90%. Consequently, mpMRI has been proposed as a stratification and staging tool to detect csPCA while limiting unnecessary biopsies. However, wide variation exists in the application and interpretation of mpMRI. It remains to be seen if the high NPV published from expert centers remains reproducible and generalizable. We aimed to determine the real-world NPV of mpMRI across diverse practices in the Michigan Urological Surgery Improvement Collaborative (MUSIC).

METHODS: The MUSIC clinical registry was used to determine the NPV for mpMRI in the detection of csPCa, defined as Grade Group (GG) ≥ 2 PCa. We identified patients between 7/2016 – 7/2022 with negative mpMRI, defined as an absence of PI-RADS 3-5 lesions, who underwent biopsy within 1 year. Patients were classified into 2 groups: (1) biopsy naïve and (2) active surveillance (AS). NPV of MRI was summarized overall and for each subgroup. Multivariable logistic regression identified factors associated with csPCa.

RESULTS: 857 patients who underwent 871 biopsies within 1 year of negative mpMRI were identified across 26 practices. 439 biopsies were performed in the biopsy naïve setting, and 432 while on AS. Median age was 65 years (IQR 60-69) and median PSA was 5.6 ng/dl (IQR 4.1-8.1). The NPV of prostate MRI for ≥GG2 PCa in biopsy-naïve patients, those undergoing AS, and the entire cohort was 80%, 75%, and 77%, respectively. On multivariable analysis, PSA density ≥ 0.1 was associated with higher risk of having csPCa diagnosis after negative MRI (OR 5.1 [95% CI 3.22-8.01], p<0.001).

CONCLUSIONS: Across diverse urologic practices, the NPV of prostate MRI is 77%, lower than previously reported. Real-world data suggests that approximately 25% of men may miss a diagnosis of csPCA, most commonly GG2, if they do not undergo biopsy with a negative MRI. This likely represents limitations with current mpMRI implementation, and an opportunity to more accurately identify which patients should undergo biopsy, despite negative mpMRI findings. PSA density ≥ 0.1 should be utilized as a stratification tool for pursuing prostate biopsy after a negative mpMRI.
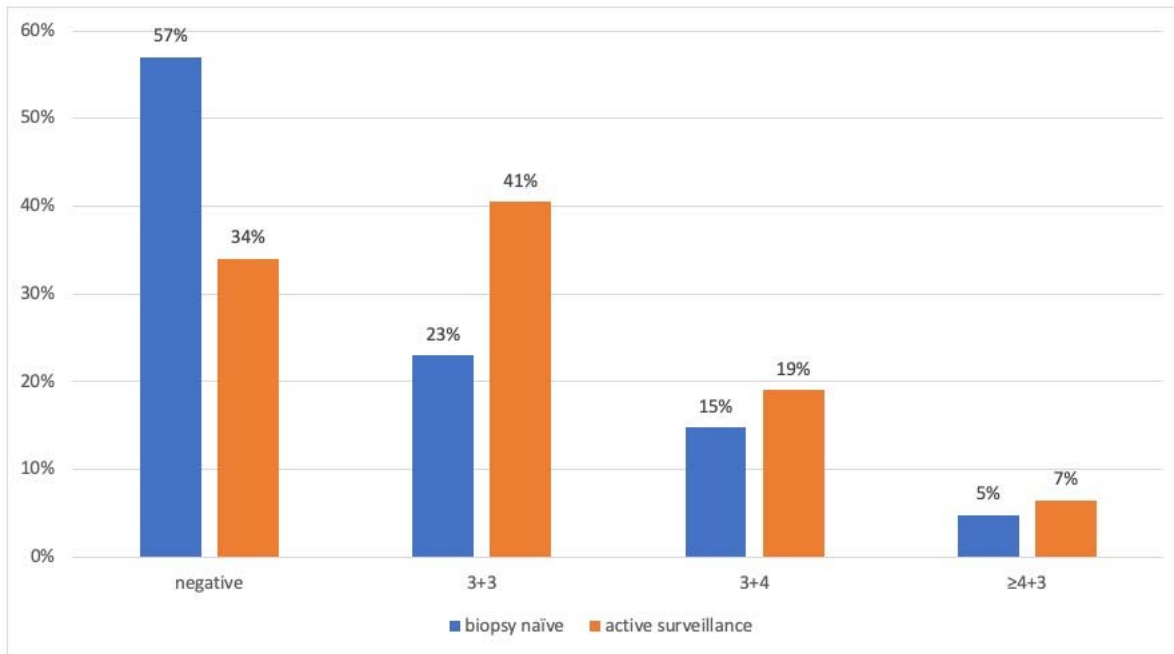
Figure. Prostate biopsy results after negative prostate MRI (biopsy naïve + active surveillance setting)