Performance of Systematic Biopsy Cores Contralateral and Ipsilateral to MR targets on MR fusion biopsy for Detection of Clinically Significant Prostate Cancer

Hannah H Riskin-Jones, MSc[1]; Rushikesh Kulkarni, MS[1]; Corey W Arnold, PhD[1]; Anthony E Sisk, DO[3]; Ely Felker, MD[1]; Matthew Quirk, MD[1]; David SK Lu, MD[1]; Leonard S Marks, MD[2]; Steven S Raman, MD[1]

[1]Department of Radiology; [2]Department of Urology; [3]Department of Pathology, David Geffen School of Medicine at UCLA

UCLA Health

Background

- The choice between systematic, targeted, or combined biopsies for prostate cancer is controversial.
- Aim: To determine the added cancer detection rate (CDR) for clinically significant (csPCa), insignificant (ciPCa), and all prostate cancer (PCa) of contralateral and ipsilateral systematic biopsy (SB) cores as compared to unilateral Transrectal MR-US fusion biopsy (MRgFbx) for 3Tmultiparametric MRI (3TmpMRI) detected lesions.

Methods

- 767 consecutive biopsies in 737 men with unilateral 3TmpMRI detected lesions (men with mid-line or bilateral targets were excluded) who subsequently underwent Combined biopsy (CB; both MRgFbx and SB) for suspected PCa, with ≥8 SB cores.
- 3TmpMRI was performed without endorectal coil on a Siemens Scanner (Siemens Healthineers, Malvern, Pa). MRgFbx was performed on the Artemis System (Eigen, Grass Valley, CA)
- In the study cohort, an average of 11.6 SB cores were obtained, with 1-3 3TmpMRI targets/patient, and an average of 4.7 biopsy cores/MR target.
- csPCa was defined as Gleason Score (GS) of 6 or higher and ciPCa as GS of 6.
- SB CDR was subdivided into contralateral (SBc) and ipsilateral (SBi) sub-cohorts CDR were calculated for CB, and the MRgFbx, SBc and SBi sub-cohorts.
- Significance of differences was determined by the McNemar's test with continuity correction.

Results

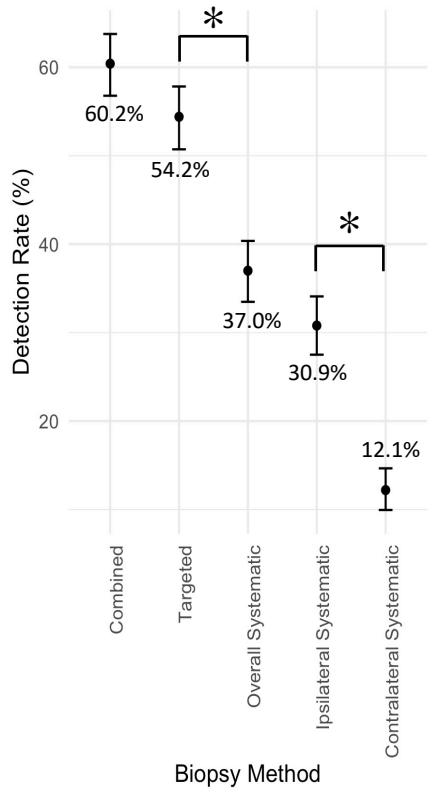

Figure 1. Detection rate (%) for csPCa by biopsy method. *p<0.001

Biopsy Method	Benign (GS<6)	ciPCa (GS=6)	csPCa (GS>6)
Ipsilateral Systematic	361 (47.1%)	169 (22.0%)	237 (30.9%)
Contralateral Systematic	489 (63.8%)	185 (24.1%)	93 (12.1%)
All Systematic	269 (35.1%)	214 (27.9%)	284 (37.0%)
Targeted	215 (28.0%)	136 (17.7%)	416 (54.2%)
Combined	141 (18.4%)	164 (21.4%)	462 (60.2%)

Table 1. Detection rate (%) for benign results, ciPCa, and csPCa by biopsy method

Added Value of Ipsilateral and Contralateral Systematic Cores:

- Of the csPCa detected on CB cohort, 10.0% (46/462) were missed by MRgFbx but detected by SB.
  - 30 (6.5%) by SBi only with mean GS 7, mean cancer core length (CCL) 6mm
  - 14 (3.0%) by SBc only; GS 7.2, CCL 3.3 mm
  - 2 (0.4%) by both; GS 7, CCL 4.75mm
- Overall, the combination of MRgFbx and SBi detected csPCa in 97.0% (448/462) cores detected by CB.

Conclusions

- The combination of MRgFbx and a wider ipsilateral systematic biopsy detected 97% of csPCa detected on CB, suggesting that high csPCa detection rates may be obtained with less overall sampling and morbidity.
- Identifying the highest yield sampling scheme for systematic biopsy may reduce post-biopsy adverse events (including sepsis), which have been shown to increase with the number of biopsy cores.

References

1. Ahmed HU, El-Shater Bosaily A, Brown LC, et al. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. *Lancet*. 2017;389(10071):815-822. doi:10.1016/S0140-6736(16)32401-1
2. Ahdoot M, Wilbur AR, Reese SE, et al. MRI-targeted, systematic, and combined biopsy for prostate cancer diagnosis. *N Engl J Med*. 2020. doi:10.1056/NEJMoa1910038
3. Kasivisvanathan V, Rannikko AS, Borghi M, et al. MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis. *N Engl J Med*. 2018;378(19):1767-1777. doi:10.1056/NEJMoa18019931.