

The Institutional Learning Curve of Magnetic Resonance Imaging-Ultrasound Fusion Targeted Prostate Biopsy: Temporal Improvements in Cancer Detection in 4 Years

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Abstract

Purpose: While magnetic resonance imaging-ultrasound fusion targeted biopsy allows for improved detection of clinically significant prostate cancer, a concerning amount of clinically significant disease is still missed. We hypothesized that a number of these misses are due to the learning curve associated with magnetic resonance imaging-ultrasound fusion targeted biopsy. We report the results of repeat magnetic resonance imaging-ultrasound fusion targeted biopsy in men with continued suspicion for cancer and the institutional learning curve in the detection of clinically significant prostate cancer with time.

Materials and methods: We analyzed the records of 1,813 prostate biopsies in a prospectively acquired cohort of men who presented for prostate biopsy in a 4-year period. All men were offered prebiopsy magnetic resonance imaging and were assigned a maximum PI-RADS™ (Prostate Imaging Reporting and Data System version 2) score. Biopsy outcomes in men with a suspicious region of interest were compared. The relationship between time and clinically significant prostate cancer detection was analyzed.

Results: The clinically significant prostate cancer detection rate increased 26% with time in men with a PI-RADS 4/5 region of interest. On repeat magnetic resonance imaging-ultrasound fusion targeted biopsy in men with continued suspicion for cancer 53% of those with a PI-RADS 4/5 region of interest demonstrated clinically significant discordance from the initial magnetic resonance imaging-ultrasound fusion targeted

biopsy compared to only 23% with a PI-RADS 1/2 region of interest. Significantly less clinically significant prostate cancer was missed or under graded in the most recent biopsies compared to the earliest biopsies.

Conclusions: The high upgrade rate on repeat magnetic resonance imaging-ultrasound fusion targeted biopsy and the increasing cancer detection rate with time show the significant learning curve associated with magnetic resonance imaging-ultrasound fusion targeted biopsy. Men with low risk or negative biopsies with a persistent, concerning region of interest should be promptly rebiopsied. Improved targeting accuracy with operator experience can help decrease the number of missed cases of clinically significant prostate cancer.