Prostate Cancer

Multiparametric Magnetic Resonance Imaging (MRI) and MRI–Transrectal Ultrasound Fusion Biopsy for Index Tumor Detection: Correlation with Radical Prostatectomy Specimen

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Abstract

Background

Multiparametric magnetic resonance imaging (mpMRI) and MRI fusion targeted biopsy (FTB) detect significant prostate cancer (sPCa) more accurately than conventional biopsies alone.

Objective

To evaluate the detection accuracy of mpMRI and FTB on radical prostatectomy (RP) specimen.

Design, setting and participants

From a cohort of 755 men who underwent transperineal MRI and transrectal ultrasound fusion biopsy under general anesthesia between 2012 and 2014, we retrospectively analyzed 120 consecutive patients who had subsequent RP. All

received saturation biopsy (SB) in addition to FTB of lesions with Prostate Imaging Reporting and Data System (PI-RADS) score ≥2.

Outcome measurements and statistical analysis

The index lesion was defined as the lesion with extraprostatic extension, the highest <u>Gleason score</u> (GS), or the largest tumor volume (TV) if GS were the same, in order of priority. GS 3 + 3 and TV ≥1.3 ml or GS ≥3 + 4 and TV ≥0.55 ml were considered sPCa. We assessed the detection accuracy by mpMRI and different biopsy approaches and analyzed lesion agreement between mpMRI and RP specimen.

Results and limitations

Overall, 120 index and 71 nonindex lesions were detected. Overall, 107 (89%) index and 51 (72%) nonindex lesions harbored sPCa. MpMRI detected 110 of 120 (92%) index lesions, FTB (two cores per lesion) alone diagnosed 96 of 120 (80%) index lesions, and SB alone diagnosed 110 of 120 (92%) index lesions. Combined SB and FTB detected 115 of 120 (96%) index foci. FTB performed significantly less accurately compared with mpMRI (p = 0.02) and the combination for index lesion detection (p = 0.002). Combined FTB and SB detected 97% of all sPCa lesions and was superior to mpMRI (85%), FTB (79%), and SB (88%) alone (p < 0.001 each). Spearman's rank correlation coefficient for index lesion agreement between mpMRI and RP was 0.87 (p < 0.001). Limitations included the retrospective design, multiple operators, and nonblinding of radiologists.

Conclusions

MpMRI identified 92% of index lesions compared with RP <u>histopathology</u>. The combination of FTB and SB was superior to both approaches alone, reliably detecting 97% of sPCa lesions.

Patient summary

Multiparametric magnetic resonance imaging detects the index lesion accurately in 9 of 10 patients; however, the combined biopsy approach, while

missing less significant cancer, comes at the cost of detecting more insignificant cancer.