Detection of recurrent prostate cancer after primary radiation therapy: An evaluation of the role of multiparametric 3T magnetic resonance imaging with endorectal coil.

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Abstract

OBJECTIVES: The value of multiparametric magnetic resonance imaging (mpMRI) in staging prostate cancer (PCa) before salvage prostatectomy is currently unclear because of the minimal data comparing mpMRI results to final pathologic stage at surgery. The aim of the study is to determine the diagnostic performance of mpMRI in characterizing viable recurrent tumor and lymph node metastasis following radiation therapy (RT) failure.

METHODS AND MATERIALS: Between January 2007 and July 2014, 19 patients with biopsy-proven recurrent PCa after primary RT underwent 3T mpMRI and subsequent salvage prostatectomy with extended pelvic lymphadenectomy. mpMRI images were independently reviewed by 2 genitourinary MRI radiologists (R1 and R2), blinded to the pathology results, to evaluate extraprostatic extension (EPE), seminal vesicle invasion (SVI), and pelvic lymph node metastasis (PLNM). Sensitivity, specificity, positive predictive value, negative predictive value, receiver operating characteristic curves, and interobserver agreement (R1 and R2) were evaluated for each outcome on a per-patient basis. Final pathologic results were used as a gold standard for comparison in all patients. A multivariate analysis was conducted to assess the relationship between the index lesion's apparent diffusion coefficient value and its enhancement characteristics with the Gleason score.

RESULTS: EPE was found in 14 (73.7%) patients, SVI in 13 (68.4%), and PLNM in 5 (26.3%). mpMRI sensitivity for PLNM was 60.0% (R1 and R2) with specificity of 85.7% (R1) and 92.8% (R2). With regards to SVI, the sensitivity was 61.5% (R1) and 76.9% (R2), with a specificity of 66.6% (R1 and R2). Sensitivity for EPE was 50.0% (R1) and 71.43% (R2), with a specificity of 80.0% (R1) and 100.00% (R2). No significant associations were found at multivariate analysis. The evaluation of PLNM, SVI, and PCa recurrence within the prostate demonstrated moderate interobserver agreement (κ, 0.51-0.57).

CONCLUSIONS: mpMRI has good accuracy for detecting PLNM, SVI, and EPE after RT. mpMRI provides useful information in locally recurrent PCa following primary radiation therapy.

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