

Role of Magnetic Resonance Imaging Targeted Biopsy in Detection of Prostate Cancer Harboring Adverse Pathological Features of Intraductal Carcinoma and Invasive Cribriform Carcinoma

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Abstract

Purpose: The aim of this study was to compare biopsy detection of intraductal and cribriform pattern invasive prostate carcinoma in multiparametric magnetic resonance imaging positive and negative regions of the prostate.

Materials and methods: We queried a prospectively maintained, single institution database to identify patients who underwent multiparametric magnetic resonance imaging/ultrasound fusion targeted biopsy and concurrent systematic sextant biopsy of magnetic resonance imaging negative regions between January 2013 and May 2016. All multiparametric magnetic resonance imaging targets were reviewed retrospectively by 2 readers for the PI-RADS™ (Prostate Imaging-Reporting and Data System), version 2 score, the maximum dimension, the apparent diffusion coefficient parameter and whether positive or negative on dynamic contrast enhancement sequence. Biopsy slides were reviewed by 2 urological pathologists for Gleason score/Grade Group and the presence or absence of an intraductal/cribriform pattern.

Results: A total of 154 patients were included in study. Multiparametric magnetic resonance imaging/ultrasound fusion targeted biopsy and systematic sextant biopsy of magnetic resonance imaging negative regions were negative for prostate carcinoma in 51 patients, leaving 103 available for the correlation of multiparametric magnetic resonance imaging and the intraductal/cribriform pattern. Prostate carcinoma was

identified by multiparametric magnetic resonance imaging/ultrasound fusion targeted biopsy in 93 cases and by systematic sextant biopsy of magnetic resonance imaging negative regions in 76 ($p = 0.008$). Intraductal/cribriform positive tumor was detected in 23 cases, including at the multiparametric magnetic resonance imaging/ultrasound fusion targeted biopsy site in 22 and at the systematic sextant biopsy of magnetic resonance imaging negative region site in 3 ($p < 0.001$). The intraductal/cribriform pattern was significantly associated with a PI-RADS score of 5 and a decreasing apparent diffusion coefficient value ($p = 0.008$ and 0.005 , respectively). In 19 of the 23 cases with the intraductal/cribriform pattern prior 12-core standard systematic biopsy was negative in 8 and showed Grade Group 1 disease in 11.

Conclusions: Multiparametric magnetic resonance imaging/ultrasound fusion targeted biopsy was associated with significantly increased detection of intraductal/cribriform positive prostate carcinoma compared to systematic sextant biopsy of multiparametric magnetic resonance imaging negative regions. This supports the role of magnetic resonance imaging to enhance the detection of clinically aggressive intraductal/cribriform positive prostate carcinoma.