Tumor contact with prostate capsule on magnetic resonance imaging: A potential biomarker for staging and prognosis.


Abstract

BACKGROUND: The high-spatial resolution of multiparametric magnetic resonance imaging (mpMRI) has improved the detection of clinically significant prostate cancer. mpMRI characteristics (extraprostatic extension [EPE], number of lesions, etc.) may predict final pathological findings (positive lymph node [pLN] and pathological ECE [pECE]) and biochemical recurrence (BCR). Tumor contact length (TCL) on MRI, defined as the length of a lesion in contact with the prostatic capsule, is a novel marker with promising early results. We aimed to evaluate TCL as a predictor of +pathological EPE (+pEPE), +pathological LN (+pLN), and BCR in patients undergoing robotic-assisted laparoscopic radical prostatectomy.

MATERIALS AND METHODS: A review was performed of a prospectively maintained single-institution database of men with prostate cancer who underwent prostate mpMRI followed by robotic-assisted laparoscopic radical prostatectomy without prior therapy from 2007 to 2015. TCL was measured using T2-weighted magnetic resonance images. Logistic and Cox regression analysis were used to assess associations of clinical, imaging, and histopathological variables with pEPE, pLN, and BCR. Receiver operating characteristic curves were used to characterize and compare TCL performance with Partin tables.

RESULTS: There were 87/379 (23.0%) +pEPE, 18/384 (4.7%) +pLN, and 33/371 (8.9%) BCR patients. Patients with adverse pathology/oncologic outcomes had longer TCL compared to those without adverse outcomes (+pEPE: 19.8 vs. 10.1mm, P<0.0001, +pLN: 38.0 vs. 11.7mm, P<0.0001, and BCR: 19.2 vs. 11.2mm, P = 0.001). On multivariate analysis, TCL remained a predictor of +pEPE (odds ratio: 1.04, P = 0.001), +pLN (odds ratio: 1.07, P<0.0001), and BCR (hazard ratio: 1.03, P = 0.02). TCL thresholds for predicting +pEPE and +pLN were 12.5 and 19.7mm, respectively. TCL alone was found to have good predictive ability for +pEPE and +pLN (pEPE:TCL AUC: 0.71 vs. Partin AUC: 0.66, P = 0.21; pLN: TCL AUC: 0.77 vs. Partin AUC: 0.88, P = 0.04).

CONCLUSION: We demonstrate that TCL is an independent predictor of +pEPE, +pLN, and BCR. If validated, this imaging biomarker may facilitate and inform patient counseling and decision-making.

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