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MRI TUMOR CONTACT LENGTH WITH PROSTATE CAPSULE COMPARED TO PARTIN TABLES IN THE PREDICTION OF ADVERSE PATHOLOGICAL OUTCOMES IN PROSTATE CANCER

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Purpose: The high spatial resolution of multiparametric MRI (mpMRI) has improved detection of clinically significant prostate cancer. MpMRI characteristics [extraprostatic extension (EPE), number of lesions etc] may predict final pathological findings such as positive lymph node (+pLN) and pathological EPE (+pEPE) at radical prostatectomy (RP). Biochemical recurrence (BCR) after RP can occur in 20-40% of patients and is be predictive of metastasis and death. Tumor contact length on MRI (TCL), defined as length of lesion in contact with the prostatic capsule, is a novel marker with promising early results. We aim to evaluate the ability of TCL in predicting +pEPE, +pLN and BCR in patients undergoing RP.

Methods: A review was performed of a prospectively maintained single institution database of men with PCa who underwent prostate mpMRI followed by RP without prior therapy from 2007 to 2015. TCL was measured using T2-weighted MR images. Predicted probabilities of +pEPE and +pLN were obtained using online Partin tables. Logistic and Cox regression analysis 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 median TCL compared to those without (+pEPE: 19.8 vs 10.1 mm, p<0.0001, +pLN: 38.0 vs 11.7 mm, p<0.0001 and BCR: 19.2 vs 11.2 mm, p=0.001). On multivariate analysis, TCL remained an independent predictor of +pEPE (p=0.001), +pLN (p<0.0001) and BCR (p=0.02). TCL thresholds yielding highest sensitivity and specificity for predicting +pEPE and +pLN were 12.5 mm and 19.7 mm 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. Predictive ability of MRI TCL is similar to Partin Tables for +pEPE and slightly lower for +pLN. Future validation could justify TCL as a robust objective mpMRI parameter that informs patient counseling and decision making.