PE30 Development and external validation of a new nomogram to predict side-specific extraprostatic extension in patients with prostate cancer undergoing robot assisted radical prostatectomy (RARP)

EUR Urol Suppl 2019;18(6):e2591

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Introduction & Objectives: To decrease the risk of an ipsilateral positive surgical margin, prediction of side-specific extraprostatic extension (EPE) of prostate cancer is the centrepiece when selecting patients for nerve-sparing RARP. Although mpMRI is the most useful tool for local prostate cancer staging, its sensitivity for EPE is low and therefore additional tools are needed to predict EPE. Our aim is to develop and to externally validate nomogram predicting side-specific EPE based on MRI, targeted and systematical biopsy results and serum PSA levels.

Materials & Methods: The model was developed using 1,463 prostate lobes derived from a cohort of 785 patients undergoing RARP from 2014 to 2018 at a single centre. The model was externally validated in two separate cohorts including 865 and 2,108 prostate lobes derived from respectively 455 (cohort 1) and 1,054 (cohort 2) undergoing RARP at three other Dutch hospitals. A multivariable logistic regression model with a random intercept, including the predictors prostate specific antigen (PSA) density, clinical and radiological T-stage, and histopathology grading, was used to predict the likelihood of EPE of radical prostatectomy specimen. Discriminative ability and calibration of the model were assessed. Net benefit was determined using decision curve analysis (DCA).

Results: In the development cohort the included variables were all significant predictors for EPE. Discriminative ability in the development cohort was good given the AUC of 0.80 (95% CI: 0.79 – 0.82). On external validation, discrimination was also good in cohort 1 (AUC: 0.82 [95%CI 0.78 – 0.85]) and fair in cohort 2 (AUC: 0.77 [95%CI 0.74 – 0.80]). Calibration was excellent in both development and validation 1 cohort. In validation cohort 2 we observed overfitting for risk predictions above 30%, possibly due to the less severe case-mix of the cohort. Using a threshold of 15%, sensitivity and specificity were 87% and 53% for the development cohort and respectively 85% and 65% in validation cohort 1 and 78% and 60% in validation cohort 2. DCA showed the model to be superior to MRI alone in all populations when using probability cut-offs between 10% to 30%.

Conclusions: The developed nomogram can accurately predict side specific EPE of prostate cancer and may aid in selecting patients for nerve-sparing surgery.