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DEVELOPMENT OF BLADDER OUTLET OBSTRUCTION NOMOGRAM AND SPLIT-SAMPLE VALIDATION AMONG MEN WITH LUTS AGED 50 OR MORE

Hypothesis / aims of study
Urodynamic study has been considered as a gold standard for diagnosis of bladder outlet obstruction (BOO) among men with lower urinary tract symptoms (LUTS). However, performing the urodynamic study is not without adverse effects and is expensive and time-consuming. We aimed to develop a nomogram predicting BOO among men with LUTS aged 50 or more using only clinical parameters other than those from urodynamic study.

Study design, materials and methods
Urodynamic and clinical data were collected from men with LUTS aged 50 or more at our institution between May 2003 and June 2013. After excluding individuals who had a possible neurogenic bladder or a temporary voiding dysfunction and who had insufficient data, a total of 873 men were included in the analyses. Parameters assessed were age at urodynamic study, PSA, IPSS, transrectal ultrasound, history of acute urinary retention, maximum flow rate (Qmax) and post-void residual (PVR) volume. BOO was defined as AG number ≥40 determined in a pressure-flow study. Among men assessed, 75% and 25% were randomly assigned to sub-cohorts for the development of nomograms and for the split-sample validation. The final regression model was selected through the stepwise procedure, and the regression coefficient-based nomograms were developed according to final models.

Results
Among all the patients, 182 (20.8%) men were detected to have BOO. In a multivariable regression analysis of the development cohort, Qmax was only the parameter that was independently associated with BOO (OR 0.861, 95%CI 0.820-0.905). To improve the predicting power, the nomogram was developed based on Qmax and additional parameters such as PVR volume and transitional zone index which met the minimum requirements for being incorporated into the nomogram (Fig. 1). The discrimination performance of the nomogram was evaluated using the calculated area under the receiver-operating characteristic curve, which demonstrated 0.720 for prediction of BOO. The developed nomogram was reasonably well fitted to the ideal line of the calibration plot. The split-sample validation of nomograms indicated 68.3% accuracy.
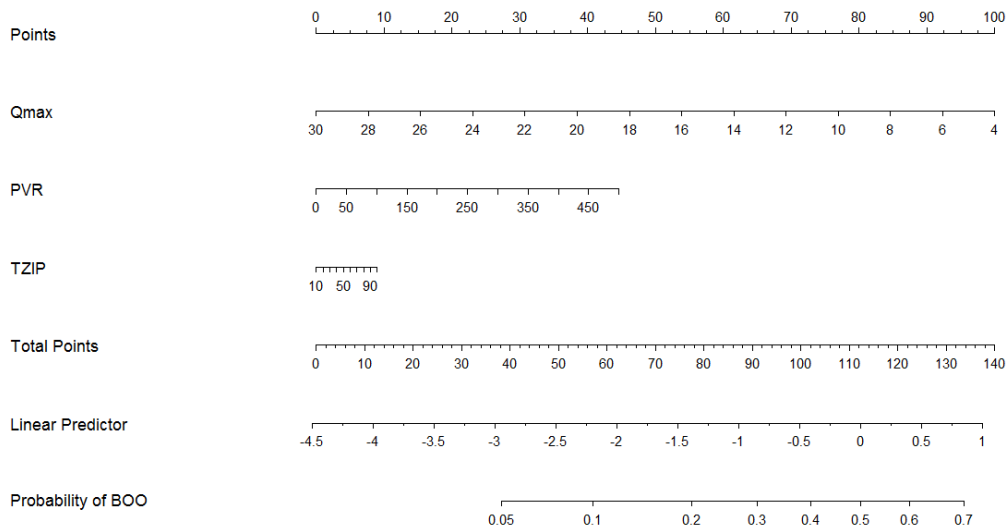
Interpretation of results
The proposed nomogram for predicting BOO is only based on Qmax, PVR volume, and transitional zone index. It demonstrates good discrimination performance and reasonable accuracy in the split-sample validation.

Concluding message
We developed a nomogram for predicting BOO, and validated adequately. The proposed nomogram based on Qmax, PVR volume, and transitional zone index may be useful for surgical treatment decision in men with LUTS aged 50 or more.

Fig. 1. Nomogram for predicting bladder outlet obstruction among men with LUTS aged 50 or more