Development and Validation of a Nomogram Predicting Recurrence Risk in Women with Symptomatic Urinary Tract Infection


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OBJECTIVES: To develop and externally validate a novel nomogram predicting recurrence risk probability at 12 months in women after an episode of urinary tract infection.

METHODS: The study included 768 women from Santa Maria Annunziata Hospital, Florence, Italy, affected by urinary tract infections from January 2005 to December 2009. Another 373 women with the same criteria enrolled at Santa Chiara Hospital, Trento, Italy, from January 2010 to June 2012 were used to externally validate and calibrate the nomogram. Univariate and multivariate Cox regression models tested the relationship between urinary tract infection recurrence risk, and patient clinical and laboratory characteristics. The nomogram was evaluated by calculating concordance probabilities, as well as testing calibration of predicted urinary tract infection recurrence with observed urinary tract infections. Nomogram variables included: number of partners, bowel function, type of pathogens isolated (Gram-positive/negative), hormonal status, number of previous urinary tract infection recurrences and previous treatment of asymptomatic bacteriuria.

RESULTS: Of the original development data, 261 out of 768 women presented at least one episode of recurrence of urinary tract infection (33.9%). The nomogram had a concordance index of 0.85. The nomogram predictions were well calibrated. This model showed high discrimination accuracy and favorable calibration characteristics. In the validation group (373 women), the overall c-index was 0.83 (P = 0.003, 95% confidence interval 0.51-0.99), whereas the area under the receiver operating characteristic curve was 0.85 (95% confidence interval 0.79-0.91).

CONCLUSIONS: The present nomogram accurately predicts the recurrence risk of urinary tract infection at 12 months, and can assist in identifying women at high risk of symptomatic recurrence that can be suitable candidates for a prophylactic strategy.