A Model for Predicting the Risk of De Novo Stress Urinary Incontinence in Women Undergoing Pelvic Organ Prolapse Surgery


OBJECTIVE: To construct and validate a prediction model for estimating the risk of de novo stress urinary incontinence (SUI) after vaginal pelvic organ prolapse (POP) surgery and compare it with predictions using preoperative urinary stress testing and expert surgeons’ predictions.

MATERIALS AND METHODS: Using the data set (n=457) from the Outcomes Following Vaginal Prolapse Repair and Midurethral Sling trial, a model using 12 clinical preoperative predictors of de novo SUI was constructed. De novo SUI was determined by Pelvic Floor Distress Inventory responses through 12 months postoperatively. After fitting the multivariable logistic regression model using the best predictors, the model was internally validated with 1,000 bootstrap samples to obtain bias-corrected accuracy using a concordance index. The model’s predictions were also externally validated by comparing findings against actual outcomes using Colpopexy and Urinary Reduction Efforts trial patients (n=316). The final model’s performance was compared with experts using a test data set of 32 randomly chosen Outcomes Following Vaginal Prolapse Repair and Midurethral Sling trial patients through comparison of the model’s area under the curve against: 1) 22 experts’ predictions; and 2) preoperative prolapse reduction stress testing.

RESULTS: A model containing seven predictors discriminated between de novo SUI status (concordance index 0.73, 95% confidence interval [CI] 0.65-0.80) in Outcomes Following Vaginal Prolapse Repair and Midurethral Sling participants and outperformed expert clinicians (area under the curve 0.72 compared with 0.62, P<.001) and preoperative urinary stress testing (area under the curve 0.72 compared with 0.54, P<.001). The concordance index for Colpopexy and Urinary Reduction Efforts trial participants was 0.62 (95% CI 0.56-0.69).

CONCLUSION: This individualized prediction model for de novo SUI after vaginal POP surgery is valid and outperforms preoperative stress testing, prediction by experts, and preoperative reduction cough stress testing. An online calculator is provided for clinical use.