

## TO EVALUATE THE RELATIONSHIP BETWEEN URODYNAMIC STUDY AND URINARY TRACT INFECTION

### Hypothesis / aims of study

Urodynamic investigation is an invasive procedure that involves urethral catheterization; it has been shown that catheterization leads to a higher prevalence of urinary tract infections (UTI) in female patients. There is still no consensus about whether prophylactic antibiotic should be given before or after urodynamic study. We try to figure out risk factors for UTI after urodynamic study by evaluating patient's clinical characteristics and urodynamic parameters.

### Study design, materials and methods

We performed a prospective study which included 261 female patients (mean age  $58.7 \pm 12.3$  years) from 2011 May to 2011 December. These patients received urodynamic investigation because they had lower urinary tract symptoms or they needed definite diagnosis before pelvic floor reconstruction or anti-incontinence surgery. All patients received urinalysis on the scheduled day of urodynamic study and 3 days after urodynamic study. All these urodynamic studies were performed by the same technician. Mid-stream urine samples were obtained for urinalysis before urodynamic study. If patients had UTI based on our urinalysis criteria before urodynamic study, the examination was postponed until patient had a 3 to 7 days course of antibiotic treatment and urinalysis showed no UTI. All the analyses were performed by using SPSS 15 (SPSS Inc., Chicago, IL). To investigate the risk factors for UTI after the investigation, those variables whose *P* value is below 0.1 in the bivariate analyses were included in the multivariable stepwise logistic regression analysis. For those variables significant in multivariable analysis, receiver operating characteristic (ROC) analyses were further conducted to discriminate UTI after investigation and to show various cut-off points.

### Results

261 subjects were enrolled in this study and all of them were females. They all received the standard urodynamic investigation. Among 261 subjects, 19 and 51 subjects had UTI before and after investigation, respectively. Table 1 showed risk factors for UTI after urodynamic study. In the multivariable analysis, An increase of number of vaginal birth was associated with an elevated risk for UTI after investigation by 1.46-fold odds ratio (95% CI: 1.13 – 1.88, *P* = 0.004). UTI before investigation (UTI history) and diabetes were associated with increased risk of UTI after investigation with an odds ratio of 5.49 (95% CI: 1.74 – 17.29, *P* = 0.004) and of 3.10 (95% CI: 1.35 – 7.14, *P* = 0.008), respectively. In contrast, an SD increase of average flow rate was associated with a decreasing risk of UTI after investigation (OR = 0.52, 95% CI: 0.33 – 0.82, *P* = 0.005). Table 2 listed selected sensitivity and specificity of number of vaginal births and average flow rate for discriminating UTI after investigation. A compromise cut-off point of number of vaginal births was equal to or greater than three with an acceptable sensitivity of 79.2% and poor specificity of 36.9%. In contrast, when favoring sensitivity, the cut-off point was chosen as equal to or greater than two with an outstanding sensitivity of 95.8% and poor specificity of 13.6%. A compromise cut-off point for average flow rate was equal to or below seven with an acceptable sensitivity of 73.5% and fair specificity and 52.2%. In contrast, when favoring sensitivity, the cut-off point was chosen as equal to or below than ten with a fine sensitivity of 89.8% and poor specificity of 30.0%.

### Interpretation of results

Our data suggest urodynamic study causes significantly increased incidence of UTI. Increased number of vaginal births, UTI before investigation, diabetes and decreased average flow rate based on urodynamic investigation are risk factors for UTI after urodynamic study.

### Concluding message

Prophylactic antibiotic could be given before urodynamic study for patients with risk factors such as increased number of vaginal births, UTI before investigation, diabetes and decreased average flow rate.

Table 1 Multivariable logistic regression model for risk factors for UTI after urodynamic investigation

Predictors	OR	95% CI of OR	<i>P</i>
Number of vaginal births	1.46	1.13 – 1.88	0.004
UTI before urodynamic investigation	5.49	1.74 – 17.29	0.004
Diabetes	3.10	1.35 – 7.14	0.008
Average flow rate (per SD)	0.52	0.33 – 0.82	0.005

Note: *N* = 248, OR = odds ratio, CI = confidence interval

Table 2 Sensitivity and specificity of the number of vaginal births and average flow rate as predictors for UTI after urodynamic investigation

Predictor / Cut-off	Sensitivity	Specificity	<i>P</i>	AUC (95% CI)
Number of vaginal births			<0.001	0.67 (0.59 – 0.76)
≥1	95.8%	8.7%		
≥2	95.8%	13.6%		
≥3	79.2%	36.9%		
≥4	52.1%	78.2%		
≥5	27.1%	90.8%		

Average flow rate (ml/sec)			<0.001	0.67 (0.58 – 0.75)
≤4	40.8%	77.8%		
≤5	55.1%	67.1%		
≤6	65.3%	59.9%		
≤7	73.5%	52.2%		
≤8	75.5%	43.0%		
≤9	83.7%	37.7%		
≤10	89.8%	30.0%		

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*Note:* AUC = area under the ROC curve; CI = confidence interval

Disclosures

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