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SERIAL CHANGES IN LOWER URINARY TRACT SYMPTOMS, URINE FLOW AND BLADDER VOIDING EFFICIENCY FOLLOWING TRANSOBTURATOR TAPE SURGERY FOR TREATMENT OF FEMALE STRESS URINARY INCONTINENCE

Hypothesis / aims of study
As mid-urethral sling (MUS) gains popularity in the treatment of female stress urinary incontinence (SUI) for decades, surgery remains one of the best treatment options for patients with SUI. Despite the favourable efficacy of MUS for treatments of female SUI, there has been a concern about its influence on lower urinary tract symptoms (LUTS) and urine flow after MUS surgery. Thus, the aim of this study was to identify the serial changes in LUTS, urine flow and bladder voiding efficiency after transobturator tape (TOT) surgery for treatment
of female SUI

Study design, materials and methods
Among 382 women who underwent TOT surgery for treatment of female SUI, a total of 196 women were included in this study. The exclusion criteria were as follows: (1) any urinary tract infection, (2) pregnancy (3) bladder malignancy and (4) postoperative follow-up of less than 12 months. We retrospectively reviewed our data gathered prospectively. Before surgery, our protocol included history and physical examination, urinalysis, urine culture, International Prostate Symptom Score (IPSS), Overactive Bladder Symptom Score (OABSS), uroflowmetry, post-void residual urine volume (PVR) measurement, 1-hour pad test, Q-tip test and urodynamic study. The TOT procedure was performed in a routine manner under local or regional anesthesia. Cystoscopy was performed to check the presence or absence of bladder injury. The patients were followed at 1-week, and 1-, 3-, 6- and 12-months after surgery. Follow-up evaluation included urinary stress test, the IPSS, the OABSS and uroflowmetry with PVR. Cure of UI after the TOT procedure was defined as the absence of a subjective complaint of urine leakage and the absence of objective leakage on stress test. All cases except for cure were considered as failure. Bladder voiding efficiency (BVE) was defined as a percentage: BVE = (voided volume)/(voided volume + PVR) × 100.

Results
Baseline characteristics were shown in Table 1. The cure rate at 12-months after surgery was 90.3%. A total of 16 (8.2%) women underwent the tape readjustment procedures. Total IPSS, QOL index, subtotal storage symptoms score of the IPSS, score of OABSS question 3, score of OABSS question 4 and total OABSS significantly improved compared to the baseline starting from 1-week after surgery, which was maintained up to 12-months postoperatively. Compared with the baseline, on the other hand, there were no significant differences in subtotal voiding symptoms score of IPSS, maximum flow rate, PVR and BVE throughout the entire follow-up period.
There was no serious complication such as bladder perforation or urethral injury during the TOT surgery. As for postoperative complications, temporary in-and-out urethral catheterization was needed in 2 cases with PVR larger than 100 ml immediately after surgery. Also, there were two cases with tape erosion into vagina, which was managed with primary repair. De novo urge urinary incontinence (UUI) occurred in fourteen (10.6%) of 132 women without UUI before surgery.

Interpretation of results
In the present study, storage symptoms significantly improved in the early postoperative period after surgery, indicating that TOT procedure could have a favourable effect on storage symptoms from immediately after surgery. Also, the TOT procedure did not affect the urine flow, PVR and BVE after surgery. Thus, the TOT procedure can be a safe treatment option for women with SUI and detrusor underactivity or acontractile detrusor. In the present study, surgical outcomes of TOT procedure for LUTS were not analyzed for longer than 12 months postoperatively because non-surgery-related factors such as aging and co-morbidities could influence storage symptoms significantly.

Concluding message
Our data suggest that TOT procedure for treatment of female SUI may alleviate storage symptoms, but not voiding symptoms. Also, the TOT surgery does not appear to have an impact on urine flow and bladder voiding efficiency. Further studies with larger cohorts are needed to validate these findings.

Table 1. Baseline characteristics

	Mean ± standard deviation or no. pts (%)
Age, yr	53.1 ± 9.9
BMI, kg/m^2	25.4 ± 3.6
Parity	2.3 ± 0.9
Previous hysterectomy	28 (14.3%)
Previous incontinence surgery	6 (3.1%)
Urge urinary incontinence	60 (30.6%)
Cystocele (grade 0 / 1 / 2 / 3)	57(29.1%) / 94(48.0%) / 42(21.4%) / 3(1.5%)
Degree of Q-tip	31.9 ± 9.2
1-hour pad, gram	35.6 ± 35.2
Subtotal voiding symptoms score	4.5 ± 5.3
Subtotal storage symptoms score	4.6 ± 4.3
Total IPSS	9.2 ± 8.8
QOL index	4.3 ± 1.4
OABSS question 3	2.4 ± 1.6
OABSS question 4	2.1 ± 1.6
Total OABSS	6.8 ± 3.7
Maximum flow rate, ml/sec	34.4 ± 14.5
PVR, ml	36.2 ± 32.5
BVE, %	90.7 ± 8.8
MUCP, cmH2O	64.7 ± 29.9
Bladder volume at first desire to void, ml	138.5 ± 53.1
Maximum cystometric capacity, ml	371.9 ± 70.8
Detrusor overactivity	10 (5.1%)

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