

## **CORRELATION BETWEEN PREOPERATIVE URODYNAMIC FINDINGS WITH CORRECTION OF PELVIC ORGAN PROLAPSE (POP) AND THE IMPROVEMENT OF OVERACTIVE BLADDER SYMPTOMS FOLLOWING TENSION-FREE VAGINAL MESH OPERATION IN WOMEN WITH POP**

### Hypothesis / aims of study

Pelvic organ prolapse (POP) is a debilitating condition in women and associated with not only voiding symptoms but also overactive bladder (OAB) symptoms such as urgency and frequent urination. Although the etiology of urinary symptoms of POP is multifactorial, it has been proposed that functional bladder outlet obstruction (BOO) due to prolapsed organs and/or reduced pelvic floor support are important causes of POP-associated non-neurogenic OAB. In this study, we aimed to elucidate the mechanisms inducing OAB condition in women with POP.

### Study design, materials and methods

After obtaining informed consent from 40 women with stage 2 or greater POP associated with cystocele, who received tension-free vaginal mesh (TVM) operation, a prospective study was performed using urodynamic studies (UDS) between May 2010 and November 2011. Prior to surgery, UDS were performed before and after the correction of POP using a single gauze pack in the vagina. UDS consisted of filling cystometry and pressure-flow study (PFS) with subjects in the sitting position using a 7 F double lumen urethral catheter. The saline infusion rate was set to be 50 ml/min.

Furthermore, they were asked to answer the overactive bladder symptom score (OABSS) and International Prostate Symptom Score (IPSS) before and 3 month after surgery. In OABSS, four storage symptoms such as daytime frequency, night time frequency, urgency, and urgency incontinence were scored.

### Results

The mean age of the patients was  $68.8 \pm 6.5$  years (51-80 years). As a result of insertion of a gauze pack in the vagina, bladder capacity (BC) at first desire to void (FDV) was increased significantly from  $113 \pm 53$  ml to  $158 \pm 50$  ml ( $p < 0.001$ ). Detrusor pressure ( $P_{det}$ ) at FDV after gauze pack insertion was changed from  $5.2$  cmH<sub>2</sub>O to  $3.1$  cmH<sub>2</sub>O with significant difference ( $p < 0.02$ ). The BC at maximum desire to void (MDV) was also increased significantly from  $222 \pm 75$  ml to  $284 \pm 67$  ml ( $p < 0.001$ ), and  $P_{det}$  at MDV decreased significantly from  $11.4 \pm 14.1$  cmH<sub>2</sub>O to  $4.6 \pm 5.4$  cmH<sub>2</sub>O ( $p < 0.0006$ ) following the insertion of a gauze pack.

In 21 of 40 cases (52.5%), POP was accompanied with OAB (dry in 3 cases and wet in 18 cases), and detrusor overactivity (DO) was observed in 14 out of 21 POP+OAB cases (66.7%). When a gauze pack was inserted into the vagina to correct POP in these 14 cases with DO, cystometric analyses showed that DO was resolved in 11 cases (78.6%) and reduced in additional 1 case.

In 21 patients who have had OAB preoperatively, OAB symptoms disappeared in 14 cases (66.7%) and improved in 2 additional cases (9.5%) after TVM operation. Eleven out of 14 cases whose OAB symptoms disappeared after TVM surgery were coincided with those who had showed either disappearance ( $n=9$ ) or improvement ( $n=1$ ) of DO after intravaginal gauze pack insertion in preoperative UDS (Table 1). The remaining 5 cases whose OAB symptoms were not changed after TVM needed to be treated with anticholinergic drugs. After TVM operation, urgency score and the sum score in OABSS were decreased significantly from  $1.5 \pm 1.4$  to  $0.7 \pm 1.1$  ( $p < 0.0009$ ) and from  $4.1 \pm 2.8$  to  $3.0 \pm 2.8$  ( $p < 0.01$ ), respectively. In IPSS, all questionnaire scores except for night time frequency were decreased with significant difference and QOL score also significantly improved from  $4.3 \pm 1.6$  to  $1.9 \pm 1.5$  ( $p < 0.0001$ ).

### Interpretation of results

An approximately half of patients with POP exhibited OAB symptoms. Preoperative UDS demonstrated that 66.7% of POP+OAB patients had DO and that DO disappeared after inserting a gauze pack into the vagina in 78.6% of OAB cases who had DO prior to gauze pack insertion.

After TVM operation, OAB symptoms disappeared (66.7%) or improved (additional 9.5%) among 21 POP+OAB cases, and urgency score in OABSS and all IPSS questionnaire scores except for night time frequency improved significantly. In addition, disappearance of OAB symptoms after TVM surgery was highly correlated with that of DO after intravaginal gauze pack insertion in preoperative UDS.

These results suggest that; (1) OAB symptoms often seen in POP patients are positively associated with DO, for which POP-induced cystocele is a direct cause in many cases and (2) preoperative UDS with POP correction using an intravaginal gauze pack can predict the postoperative improvement of OAB and DO in POP patients who undergo TVM.

### Concluding message

The present study showed that POP is an important direct cause of OAB symptoms as exemplified by the immediate decrease of DO following POP correction during UDS. Since OAB or DO conditions can be reversed within a short period of time after POP correction (either by TVM surgery or gauze pack insertion, respectively) in many cases, POP-induced bladder overdistention due to cystocele, which could elicit afferent nerve sensitization in response to bladder stretch and/or decrease bladder blood flow, is considered to be directly involved in the emergence of OAB associated with POP.

Furthermore, preoperative UDS with POP correction using intravaginal gauze pack insertion could be a useful method for predicting the outcome of POP surgery in the improvement of OAB symptoms.

TABLE 1

	<u>DO after intravaginal gauze pack insertion (UDS) (n=14)</u>		
	Disappeared (n=11)	Improved (n=1)	Unchanged (n=2)
<u>OAB after TVM</u>			
Disappeared	9	1	1
Improved	2	0	0
Unchanged	0	0	1

Disclosures

**Funding:** None **Clinical Trial:** Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics not Req'd:** This study is based on the ordinary examination for the patients who are planning to receive the operation for their POP and this study was exempt from institutional ethics committee approval in the country of origin. **Helsinki:** Yes **Informed Consent:** Yes