

## COMPARISONS OF PREVALENCE RATES, URODYNAMIC VARIABLES, BLADDER DIARIES AND QUALITY OF LIFE BETWEEN THE FUNCTIONAL BLADDER OUTLET OBSTRUCTION AND DETRUSOR UNDERACTIVITY GROUPS IN FEMALE VOIDING DYSFUNCTION

### Hypothesis / aims of study

Female lower urinary tract symptoms (LUTS) may be same in the diagnosis of functional bladder outlet obstruction (BOO) and detrusor underactivity (DU); however, their treatments differ. Thus, the aims of this study are to compare the differences in prevalence rates, urodynamic variables, bladder diaries and quality of life between functional BOO and DU.

### Study design, materials and methods

The medical records, including clinical characteristics, urodynamic studies, bladder diaries and questionnaires in female LUTS who underwent urodynamic studies with the findings of functional BOO or DU between March 2011 and August 2015 at the Department of Obstetrics & Gynecology of a tertiary referral center, were retrospectively reviewed. Functional BOO was defined as maximum flow rate (Q<sub>max</sub>) <15 mL/s at uroflowmetry with detrusor pressure at Q<sub>max</sub> (P<sub>det</sub>Q<sub>max</sub>) >20 cmH<sub>2</sub>O at voiding cystometry, and DU was defined as Q<sub>max</sub> <15 mL/s with P<sub>det</sub>Q<sub>max</sub> <20 cmH<sub>2</sub>O.

### Results

A total of 2,381 consecutive female LUTS without cystocele were analyzed. Of them, 122 (5.1%) was functional BOO and 92 (3.9%) DU, while 25.4% (31/122) in functional BOO and 28.3% (26/92) in DU had voiding dysfunction symptoms, respectively (Table 1). Patients with DU had lower overactive bladder symptom scores, post-void residual, Valsalva leak point pressure, maximum urethral pressure and maximum urethral closure pressure, but having higher Q<sub>max</sub> at voiding cystometry, compared with functional BOO (Table 1). In addition, patients with DU had lower social limitations, emotions, nocturia and urgency scores of King's Health Questionnaires (Table 2). The mean Q<sub>max</sub> of uroflowmetry was different to that of voiding cystometry in the functional BOO group (Wilcoxon signed-rank test, P <0.0001), but not in the DU group (P = 0.18).

### Interpretation of results

Female patients with DU are less affected by overactive bladder symptoms, but have a lower urethral closure function. However, female patients with functional BOO have poor health-related quality of life, especially in the social limitations and emotions domains. Besides, the Q<sub>max</sub> in the functional BOO group seems liable to be affected by the urethral catheter at voiding cystometry, but not the DU group.

### Concluding message

Female patients with functional BOO have a higher severity of concomitant overactive bladder symptoms and a lower health-related quality of life, compared with DU.

**Table 1.** Clinical, bladder diaries and urodynamic variables between the female functional bladder outlet obstruction and detrusor underactivity groups

Variables	BOO (n=122)	DU (n=92)	†P	‡Coefficient	‡P
Age (yrs)	60.0±14.9	67.8±11.1	0.0001	-	-
Parity	2.7±1.7	3.4±1.7	0.0004	-	-
USS	2.1±1.1	2.0±1.0	0.55	-0.3	0.08
PPBC	4.1±1.4	3.8±1.3	0.11	-0.4	0.07
OABSS	8.2±3.7	7.7±3.8	0.45	-1.2	0.02
UDI-6	7.2±3.8	7.3±4.1	0.89	-0.3	0.59
IIQ-7	8.6±5.9	8.0±5.6	0.55	-0.8	0.35
Daytime frequency episodes (72 h)	34.9±18.0	30.3±14.3	0.13	-1.32	0.62
Nocturia episodes (72 h)	6.6±3.8	6.7±4.7	0.57	0.10	0.89
Urgency episodes (72 h)	11.2±12.5	9.2±10.8	0.33	-2.2	0.29
Incontinence episodes (72 h)	2.6±6.0	2.3±4.7	0.52	-0.9	0.30
Voided Volume (mL, 72 h)	5176±2066	5000±1983	0.66	155	0.64
Fluid intake (mL, 72 h)	4788±2069	4959±1862	0.48	497	0.13
VVmax (mL)	308±123	329±131	0.35	34	0.12
Pad weight (g)	26.5±40.3	33.1±41.5	0.03	1.1	0.84
Q <sub>max</sub> (mL/s)	10.4±2.8	9.7±2.7	0.04	-0.3	0.42
Q <sub>avr</sub> (mL/s)	3.9±1.5	3.7±1.4	0.25	0.03	0.89
Voided volume (mL)	195±111	171±87	0.16	-3	0.82
PVR (mL)	62±59	44±29	0.14	-22	0.002
Voiding time (s)	59.0±31.6	56.5±36.1	0.40	-0.2	0.97
First desire (mL)	123±40	126±38	0.47	5	0.34
Normal desire (mL)	168±52	173±46	0.45	9	0.21

Strong desire (mL)	211±63	214±57	0.75	8	0.38
Urgency (mL)	273±82	278±83	0.94	12	0.29
Qmax at cystometry (mL/s)	7.3±3.7	9.3±4.1	0.0003	1.6	0.004
PdetQmax (cmH2O)	43.5±20.3	10.4±8.2	<0.0001	-31.7	<0.0001
VLPP (cmH2O)	74.7±29.1	67.2±21.9	0.06	-9.4	0.01
MUP (cmH2O)	109.9±37.9	82.1±27.2	<0.0001	-15.0	<0.0001
MUCP (cmH2O)	64.6±37.7	38.3±24.5	<0.0001	-13.6	<0.0001
Functional profile length (cm)	2.9±1.6	2.8±1.6	0.31	0.1	0.58
PTR at MUP (%)	105.7±45.4	93.0±35.6	0.047	-10.8	0.08

† By Wilcoxon rank-sum test.

‡The coefficient of diagnosis (BOO = 0; DU = 1) is derived from linear regression analysis of the values in each variable adjusted for age and parity.

§BOO = bladder outlet obstruction; DU = detrusor underactivity; IIQ-7 = Incontinence Impact Questionnaire; MUCP = maximum urethral closure pressure; MUP = maximum urethral pressure; OABSS = Overactive Bladder Symptoms Score; PdetQmax = detrusor pressure at Qmax; PPBC = Patient Perception of Bladder Condition Questionnaire; PTR = pressure transmission ratio; PVR = post-void residual; Qavr = average flow rate; Qmax = maximum flow rate; UDI-6 = Urinary Distress Inventory Questionnaire; USS = Urgency Severity Scales; VLPP = Valsalva leak point pressure; VVmax = maximum voided volume.

**Table 2.** King's Health Questionnaires between the female functional bladder outlet obstruction and detrusor underactivity groups

Variables	BOO (n=122)	DU (n=92)	†P	Coefficient	‡P
<u>Domains</u>					
General health	56.9±19.9	50.9±21.8	0.16	-5.6	0.07
Incontinence impact	61.0±32.8	53.1±32.4	0.10	-9.1	0.06
Role limitations	48.8±32.0	44.8±30.0	0.43	-6.4	0.17
Personal limitations	50.1±31.6	47.7±31.6	0.59	-4.5	0.34
Social limitations	38.5±33.4	31.8±31.0	0.17	-12.5	0.007
Personal relationship	28.2±33.4	23.1±29.3	0.52	-9.7	0.14
Emotions	48.8±33.4	39.5±28.8	0.06	-10.7	0.02
Sleep/energy	56.3±29.5	50.5±30.7	0.14	-5.5	0.22
Severity measures	38.5±30.9	37.8±28.9	0.95	-5.9	0.17
<u>Symptoms bother</u>					
Frequency	2.9±1.1	2.6±1.2	0.06	-0.3	0.08
Nocturia	2.9±1.1	2.6±1.2	0.03	-0.4	0.009
Urgency	2.5±1.3	2.2±1.3	0.11	-0.5	0.02
Urge incontinence	1.8±1.4	1.7±1.4	0.88	-0.3	0.08
Stress incontinence	1.9±1.4	2.1±1.4	0.48	0.01	0.95
Nocturnal enuresis	0.9±1.2	0.9±1.3	0.73	-0.2	0.27
Intercourse incontinence	0.5±0.9	0.4±0.9	0.31	-0.1	0.67
Frequent waterworks infections	1.3±1.3	1.4±1.4	0.47	0.3	0.19
Bladder pain	1.2±1.2	1.1±1.3	0.31	-0.1	0.72
Difficulty passing urine	1.9±1.4	1.8±1.4	0.88	0.03	0.90

†By Wilcoxon rank-sum test.

‡The coefficient of diagnosis (BOO = 0; DU = 1) is derived from linear regression analysis of the values in each variable adjusted for age and parity.

#### Disclosures

**Funding:** none **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** National Taiwan University Hospital Research Ethics Committee **Helsinki:** Yes **Informed Consent:** No