

CHARACTERISTICS OF THE LOWER URINARY TRACT FUNCTION IN PATIENTS WITH HIGH-GRADE CYSTOCELE

Hypothesis / aims of study

We evaluated the urodynamic results focusing on the voiding phase in order to elucidate the characteristics of the lower urinary tract function associated with high-grade cystocele.

Study design, materials and methods

We prospectively evaluated 88 consecutive neurologically intact females who underwent repair surgery (anterior colporrhaphy for 68, anterior colporrhaphy plus bladder neck suspension or tension free vaginal tape: TVT for 20) for Baden-Walker classification grade □-□ cystocele at our institution between January 1995 and December 2004. All patients had undergone preoperative evaluations consisting of a focused medical history, the completion of urinary questionnaires and a voiding diary, a physical examination using the pelvic organ prolapse quantification (POP-Q) system, a stress test, voiding cystourethrography (VCG) and full urodynamics including a pressure-flow study (PFS). A free-flow evaluation and PFS, in addition to the confirmation of any associated stress urinary incontinence (SUI) by a stress test in the lithotomy position were all completed with cystocele reduction using a vaginal pessary. The patients were included in this analysis if they were judged to not be associated with preoperative SUI, and if they had completed postoperative assessment including a peak urinary flow rate taken from a free-uroflow test (F-Qmax) and ultrasound estimated post-void residual (PVR) at 6-12 months, thus resulting in 58 cases being enrolled into the final analysis. Urodynamic parameters including a maximum cystometric capacity (MCC), F-Qmax, corrected F-Qmax (F-Qmax/ $\sqrt{\text{voided volume}}$), Qmax obtained from PFS, PVR, maximum detrusor pressure (pdet.max), detrusor pressure at Qmax (pdet.Qmax), bladder contractility index (BCI: pdet.Qmax+5Qmax), urethral resistance factor (URF: pdet.Qmax/Q²max) and the maximum watt factor (WFmax) were compared with those results obtained from either 78 urologically normal women (controls) or 56 women who had undergone TVT for genuine SUI without POP over the same period. The patients were included in controls after having an informed consent if they were judged to not be associated with any of the exclusion criteria listed in the Appendix. The inter-group equality was assessed using either the ANOVA or the Kurskal-Wallis nonparametric analysis. Multiple comparisons between the groups were performed using Bonferroni's multiple comparison if no inter-group equality was proven. Other differences between the groups were analyzed using the t test. Statistical significance was considered to be present at a value of p<0.05.

Results

The results of all three groups are summarized in Table 1. The patients with cystocele were significantly older, had a significant lower Qmax (F-Qmax, corrected F-Qmax and Qmax obtained from PFS), and had a significantly lower BCI and WFmax than did the controls and patients with SUI. Similarly, the detrusor pressure during micturition (pdet.max and pdet.Qmax) was significantly lower in the whole cystocele cohort in comparison to that of the controls. The URF was not statistically different in the cystocele subjects than in the controls, but it was significantly higher in comparison to that in the patients with SUI. Those urodynamic characteristics observed among the three groups were all maintained even after adjusting for age. Although the PVR was higher in the patients with cystocele than in the control women, it was not significantly different after adjusting for age (median, 25%, 75%: in control: 6, 1, 13 and in cystocele: 6, -2, 31). The F-Qmax and PVR did not change significantly after the surgical repair in comparison to the baseline values in the patients with cystocele.

Interpretation of results

The results that URF did not differ significantly from that obtained from the controls, as well as the finding that the F-Qmax and PVR did not change significantly after the correction of the cystocele due to repair surgery, suggest that mechanical bladder outlet obstruction (BOO) by prolapse to have thus been successfully corrected by the placement of a vaginal pessary during urodynamics. After an adequate correction of BOO, the patients with severe cystocele demonstrated voiding with a low-pressure (decrease in pdet.max and pdet.Qmax) and a low-flow (decrease in Qmax). These results, along with the decrease in the WFmax and BCI, thus indicates an impairment of detrusor contractility in women with severe cystocele.

Concluding message

A higher prevalence of detrusor underactivity, which seems to be an important inherent characteristic of a lower urinary tract function, was urodynamically confirmed in patients with a high-grade cystocele in comparison to the subjects who were judged to be urologically normal and/or in women with genuine SUI.

Appendix: Exclusion criteria

Patients with any lower urinary tract symptoms confirmed by FVC and questionnaires

Neurogenic bladder dysfunction (confirmed or suspected)

Disease with BOO confirmed by VCG and/or cystoscopy

A history of anti-incontinence surgery

Patients with a urinary tract infection

Patients with any degree of pelvic organ prolapse

Patients with a PVR of 20ml or more

Known bladder neoplasms and/or stones

Table 1

	Control (78)	SUI (56)	Cystocele (58)
Age (years)	48.1 ± 12.8	55.0 ± 7.9*	62.9 ± 8.8*#
MCC (ml)	344 ± 108	370 ± 111	368 ± 109
DO (%)	0	8.3 (4/56)	0
F-Qmax (ml/sec)			
Pre-operative	27.7 ± 9.3	31.3 ± 13.0	20.9 ± 9.8*#
Post-operative	N.A.	21.4 ± 9.9**	21.7 ± 8.6
Co. F-Qmax (ml/sec)			
Pre-operative	1.71 ± 0.43	1.94 ± 0.80	1.28 ± 0.44*#
Post-operative	N.A.	1.36 ± 0.56**	1.35 ± 0.58
V.V. (ml)			
Pre-operative	278 ± 122	266 ± 88	281 ± 114
Post-operative	N.A.	257 ± 81	268 ± 86
PVR (ml)			
Pre-operative	0 (0, 8)	5 (3, 13)*	12 (0, 42)*
Post-operative	N.A.	17 (5, 40)**	14 (0, 33)
Qmax (ml/sec)	25.3 ± 10.5	26.7 ± 12.9	19.5 ± 8.6*#
pdet.Qmax (cmH ₂ O)	32.9 ± 16.2	16.2 ± 8.5*	21.3 ± 12.7*
pdet.max (cmH ₂ O)	40.6 ± 19.7	21.4 ± 10.7*	27.1 ± 14.1*
URF	0.06 (0.03, 0.09)	0.02 (0.01, 0.04)*	0.07 (0.03, 0.12)#
BCI	159 ± 53	149 ± 41	112 ± 42*#
WFmax (W/m ²)	12.7 ± 7.3	11.6 ± 3.2	8.7 ± 5.0*#

Mean ± SD

* P<0.05 (vs Control)

Median (25%, 75%)

P<0.05 (vs SUI)

DO: Detrusor overactivity

** P<0.05 (vs Pre-operative)

Co. F-Qmax: Corrected F-Qmax

V.V.: Voided volume

FUNDING: NONE**DISCLOSURES:** NONE**CLINICAL TRIAL REGISTRATION:**

This clinical trial has not yet been registered in a public clinical trials registry.

HUMAN SUBJECTS: This study was approved by the Graduate school of Medical Science, Kyushu University and followed the Declaration of Helsinki Informed consent was obtained from the patients.