

## THE ANATOMIC URETHRAL LENGTH IS CORRELATED WITH URODYNAMIC PARAMETERS AND RESULTS OF ANTI-INCONTINENCE SURGERY IN WOMEN WITH STRESS URINARY INCONTINENCE

### Hypothesis / aims of study

The distinction between anatomic urethral length and functional length is important. But there is no study that has investigated the relationship of female urethral length with urodynamic parameters. We evaluate the association between anatomic urethral length and urodynamic parameters as well as effect of anti-incontinence surgery in women with stress urinary incontinence (SUI).

### Study design, materials and methods

391 women who had transobturator sling operation for SUI between April 2009 and March 2016 were prospectively enrolled in this study. The patients underwent a physical examination and urodynamic study (UDS). Uroflowmetry and post-void residual urine volume (PVR), cystometry, Valsalva leak point pressure (VLPP), cough leak point pressure (CLPP), maximal urethral closure pressure (MUCP) and functional urethral length (FUL) were evaluated by UDS. The anatomic urethral length (AUL) was measured using Foley catheter. In order to determine a "actual urethral ratio", we calculated FUL/AUL ratio for this study.

### Results

A total of 299 patients were included in our study. The mean patient age was  $57.73 \pm 10.18$  years. The mean AUL and FUL were  $26.89 \pm 4.50$  mm and  $32.20 \pm 16.09$  mm, respectively. In Pearson correlation coefficients, FUL/AUL ratio correlated with PVR ( $-0.064$ ,  $p=0.270$ ), VLPP ( $0.193$ ,  $p=0.001$ ), CLPP ( $0.119$ ,  $p=0.040$ ) and MUCP ( $0.249$ ,  $p<0.001$ ). Multivariate analysis revealed that FUL/AUL ratio (HR 2.452,  $p=0.001$ ) and MUCP (HR 1.131,  $p=0.012$ ) were significantly associated with success of surgery.

### Interpretation of results

The female anatomic urethral length measured by simple method can be used as predictor of urodynamic parameters such as ALPP and MUCP and results of anti-incontinence surgery in women with stress urinary incontinence

### Concluding message

Our results showed that female urethral length was associated with urodynamic parameters of SUI. Also it can be used as a significant predictive factor for a successful surgery.

Table 1. Urethral length and Urodynamic parameters of study population

Variables	Mean $\pm$ SD
Anatomical urethral length (mm)	$26.89 \pm 4.50$
Functional urethral length (mm)	$32.20 \pm 16.09$
Functional urethral length / Anatomical urethral length	$1.19 \pm 0.59$
Maximal cystometric capacity (ml)	$445.06 \pm 85.01$
Maximal flow rate (ml/s)	$26.07 \pm 10.60$
Post-void residual urine volume (ml)	$22.60 \pm 30.32$
Valsalva leak point pressure (cmH2O)	$77.05 \pm 19.43$
Cough leak point pressure (cmH2O)	$95.15 \pm 19.65$
Maximal urethral closure pressure (cmH2O)	$30.2 \pm 22.8$

Table 2. Pearson correlation coefficients of Functional urethral length/Anatomical urethral length with urodynamic parameters

	Pearson correlation coefficients	p-value
Maximal cystometric capacity	-0.064	0.270
Maximal flow rate	-0.106	0.068
Post-void residual urine volume	-0.122	0.035
Valsalva leak point pressure	0.193	0.001
Cough leak point pressure	0.119	0.040
Maximal urethral closure pressure	0.249	<0.001

Table 3. Univariate analysis of relationship with success of surgery

	Hazard ratio	p-value	95% CI
Functional urethral length /Anatomical urethral length ratio	2.509	0.001	1.429-4.403
Maximal cystometric capacity	1.991	<0.001	1.286-2.695
Maximal flow rate	1.502	<0.001	1.253-2.253
Post-void residual urine volume	0.999	0.932	0.986-1.013
Valsalva leak point pressure	1.012	0.221	0.993-1.032
Cough leak point pressure	1.018	0.063	0.999-1.038
Maximal urethral closure pressure	1.326	0.029	1.001-1.724

Table 4. Multivariate analysis of relationship with success of surgery

	Hazard ratio	p-value	95% CI
Functional urethral length /Anatomical urethral length ratio	2.452	0.001	1.529-4.203
Maximal cystometric capacity	1.007	0.023	1.002-1.012
Maximal flow rate	1.072	0.019	1.012-1.136
Post-void residual urine volume	0.846	0.932	0.987-1.010
Valsalva leak point pressure	1.000	0.981	0.977-1.023
Cough leak point pressure	0.980	0.063	0.955-1.006
Maximal urethral closure pressure	1.313	0.012	1.145-1.673

#### References

1. McGuire EJ, Fitzpatrick CC, Wan J, et al. Clinical assessment of urethral sphincter function. *J Urol.* 1993;150:1452-4.
2. Delancey JO. Why do women have stress urinary incontinence? *Neurourol Urodyn.* 2010;1:S13-11.
3. von Bodman C, Matsushita K, Savage C, et al. Recovery of urinary function after radical prostatectomy: Predictors of urinary function on preoperative prostate magnetic resonance imaging. *J Urol.* 2012;187:945–950.

#### Disclosures

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