

SIMULTANEOUS CYSTOMETRY AND URETHRAL PRESSURE REFLECTOMETRY (UPR) —A NEW METHOD

Hypothesis / aims of study

The bladder and urethra comprise a functional unit and their interaction is of great importance in understanding the pathophysiology behind different types of incontinence. Simultaneous filling cystometry and urethral measurements has been conducted earlier by various investigators, but so far only by segmental measurement in the urethra and with catheters prone to artefacts. Urethral pressure reflectometry (UPR) is a new method of measuring pressure and cross-sectional area (CA) in the entire length of the urethra at a given time. A very thin polyurethane bag is placed in the urethra. A pressure is applied to the bag and the opening of the urethra is measured with reflectometry (sound waves). The method is accurate, and the set-up is robust and it has proven great reproducibility. Furthermore the UPR has the important advantage of being free from risk of catheter displacement and other artefacts (1).

The aim of this study was to test the feasibility of simultaneous cystometry and UPR to make it possible to describe the complex interaction of bladder and urethra during the filling phase.

Study design, materials and methods

This prospective, descriptive study includes five continent volunteer women, mean age 48 years (range 38-65); ten women with stress urinary incontinence (SUI), mean age 63 years (range 41-87); and three women with urgency urinary incontinence (UUI) and detrusor over-activity (DO), mean age 56 years (range 35-60). Cystometry was performed with the patient in the supine position; filling rate was 50 mls per min. Catheters used were two Ch5 for bladder filling and bladder pressure, respectively, and a Ch8 for rectal pressure, which was used as estimate for intra abdominal pressure. Bladder sensations as described by ICS/IUGA Terminology Report were noted. UPR was carried out with a preselected pressure applied to the UPR bag that kept the urethra half-open. This pressure was kept steady while filling the bladder and it allowed for observation of any changes in urethral CA at any level of the urethra during bladder filling.

Results

In the continent women, we saw a steady CA in the urethra during bladder filling. Coughs were reflected as positive pressure spikes in Vesical Pressure and Abdominal Pressure, whereas they were reflected as simultaneous compression of the urethra (min CA), as shown in Figure 1. Immediately after the cough, the urethral CA went back to the pre-cough level, though in one woman we saw a five seconds refractory period after each cough where the urethral CA was above the pre-cough level. First and strong desires to void were not reflected as changes in urethral pressure or CA. In the women with SUI we saw the same pattern as in the continent women; the urethral CA was steady, but there were refractory periods after the coughs in five of the women. The three UUI women had a different pattern. In two, the CA varied so much during bladder filling that a pressure increase or decrease in the UPR bag was needed a few times in order to keep the bag open. In the third, the CA varied considerably on two occasions where the detrusor muscle was overactive whereas it otherwise only varied a little during bladder filling.

Interpretation of results

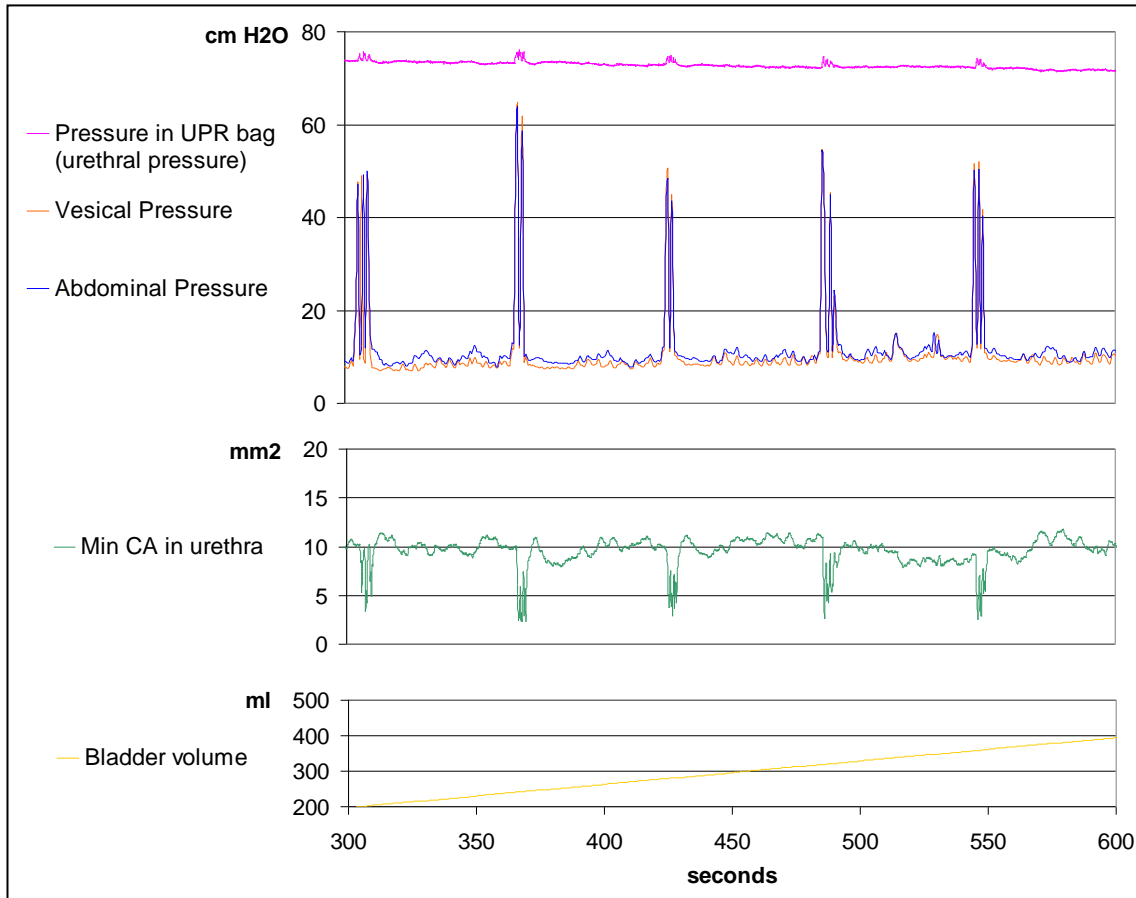
It was feasible to carry out cystometry and UPR simultaneously. This new possibility of measuring bladder and urethra as a functional unit opens for further investigation of the continence mechanism and the patho-physiology behind the different types of incontinence.

Concluding message

Simultaneous cystometry and UPR provides detailed information of interaction of bladder and urethra and gives a new prospect for understanding function and dysfunction of the lower urinary tract in women.

Figure 1:

Graphs of the parameters measured within simultaneous cystometry and Urethral Pressure Reflectometry (UPR). Coughs are reflected as positive spikes in the Vesical Pressure and as corresponding compression of the urethra (min CA). The Pressure in the UPR bag was kept steady while measuring.



References

1. Klarskov N, Lose G. Urethral pressure reflectometry; a novel technique for simultaneous recording of pressure and cross-sectional area in the female urethra. *Neurourol.Urodyn.* 262, 254-261. 2007.

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<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	HUMAN
<i>Was this study approved by an ethics committee?</i>	Yes
<i>Specify Name of Ethics Committee</i>	The Committees on Biomedical Research Ethics for the Capital Region of Denmark
<i>Was the Declaration of Helsinki followed?</i>	Yes
<i>Was informed consent obtained from the patients?</i>	Yes