

URETHRAL SENSITIVITY IN INCONTINENT WOMEN.

Hypothesis / aims of study

Urge and urge incontinence might be connected to increased urethral sensitivity. Changes in sensory perception in urethra may be of importance for understanding the pathophysiology. It is also a common urologic experience that young patients are more troubled by instrumentation at cystoscopy than old patients.

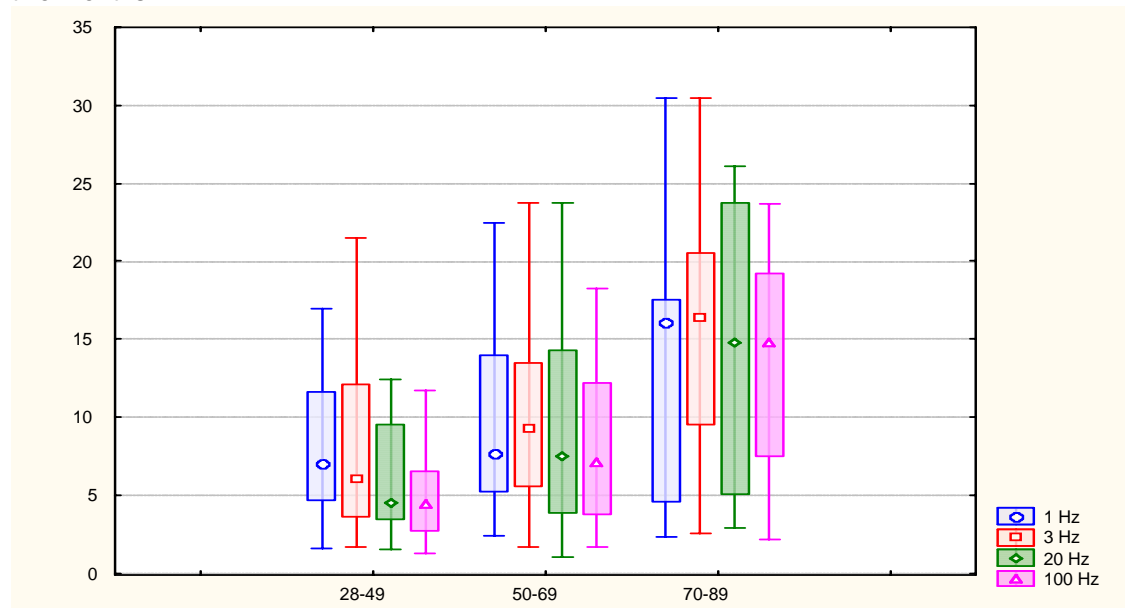
Thus the aim of this study was to examine if there is an abnormal sensory perception determined as sensitivity to electrical stimulation in urethra in patients with stress or urge incontinence, and whether the thresholds vary with age.

Study design, materials and methods

Seventy-one women, 32-84 years old, referred for urodynamic examination because of urinary incontinence were asked for participation in the study and all agreed to take part. The study was approved by the Ethical Committee of the hospital. Seven women were excluded because of earlier pelvic surgery or irradiation and another three women had to be excluded because of technical failures with the equipment. Thus 61 patients could be evaluated. Of them 17 had stress incontinence, 15 had overactive bladder with moderate urge and infrequent leakage, 16 severe urge and daily leakage and 15 had mixed incontinence symptoms with regular leakage.

Micturition diaries were performed for three days recording toilet times and voided volumes. Cystoscopy was performed in advance and free flow determination at arrival in the laboratory. A lubricating gel was injected into urethra with the patient in supine position. A 12 Ch Foley catheter with two ring electrodes 0.5 cm apart, located 1 cm below the balloon was inserted in the emptied bladder. The electrodes were connected to a Grass stimulator equipped with a constant current unit. The patients were exposed to an electrical stimulation consisting of repeated square wave pulses (duration 0.5 ms), and the stimulus current strength was slowly increased until the patient felt a tingling sensation in the urethra. The test was performed at four different frequencies 1,3,20 and 100 Hz. The stimulation was repeated 3-4 times and the current level that gave the first sensation was registered. For each stimulus frequency the mean threshold value was calculated from the individual measurements. Then cystometry was undertaken and the bladder volume at first sensation of filling and maximum subjective bladder capacity was determined.

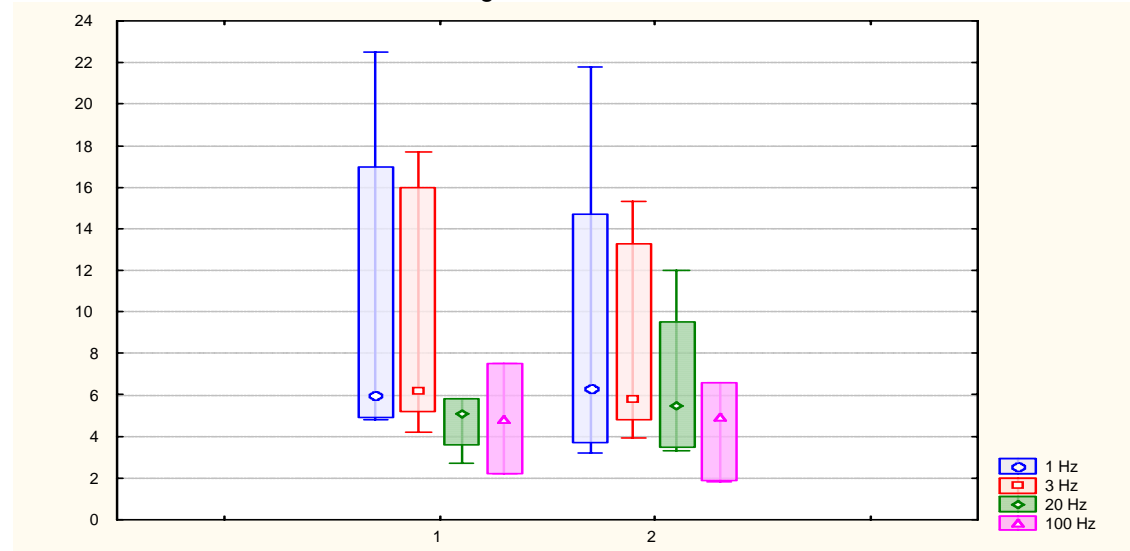
In order to test the reproducibility of the measurements seven women were reexamined within two months.



Results

The current perception thresholds were higher for low frequencies, 1 and 3 Hz, than for high frequencies, 20 and 100 Hz ($p=0.002$) (Fig 1). The increase in sensitivity at higher stimulus frequencies was more pronounced in younger patients. Overall the sensitivity thresholds were significantly higher in patients with advanced age. There were no significant differences in sensitivity between patients with pure stress incontinence, moderate or severe urge incontinence or those with mixed symptoms. Nor did we find any correlation between urethral perception and the first filling sensation, the bladder capacity or the presence of detrusor overactivity during cystometry.

Repeated measurements within two months showed similar thresholds without significantly changed current levels in comparison with the first examination (Fig 2). The correlation between the values from the two investigations was 0.744.



Interpretation of results

The decreasing sensitivity with increasing age has not previously been shown and this finding needs to be controlled in larger patient groups. It is, however, well known that sensory thresholds are dependent on the subject's age for vibration and temperature thresholds (1). A more sparse presence of sensory nerves in the mucosa following tissue degeneration with age is plausible. The inverse relation between the frequency of stimulation current and the sensitivity in posterior urethra has earlier been pointed out (2).

Although some authors consider that big scattering in the current perception thresholds in urethra makes it a doubtful method for defining pathological conditions (2), the results in the present study showed a good reproducibility in the individual patient. Measurement of sensitivity thresholds seems, however, not to be valuable in patients with urge and urge incontinence as the sensitivity was not higher than in women with stress incontinence. Some authors agree with us in this opinion (e.g. 2) while others found increased sensitivity in patients with urge (3). The diverging result in different studies may indicate that there is a need for refined electrical equipments and performance recommendations to make comparisons possible.

Concluding message

This study shows that measuring electrosensitivity might be an easy way to test sensory function and the method shows good reproducibility. In our study, however, we could not find a simple correlation between current thresholds and incontinent patient's symptoms. There was neither a simple correlation between current perception and detrusor overactivity.

References

1. Normal distributions of thermal and vibration sensory thresholds. *Muscle Nerve* 1998;21(3):367-374.
2. Ergebnisse elektrischer Sensibilitätsprüfungen an der Urethra und Vagina bei funktionellen Harninkontinenz. *Zentralblatt Gynäkol* 1986;108(23):1436-1441.
3. Mucosal Sensory Threshold of Urinary Bladder and Urethra Measured Electrically. *Urol Int* 1977;32:437-448.